

TestOut[®]

TestOut Security Pro – English 8.0

Objective Mappings:

TestOut Security Pro
CompTIA Security+ SY0-701

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Objective Mapping: LabSim Section to CompTIA SY0-701 Objective

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3.2 Given a scenario, apply security principles to secure enterprise infrastructure

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4.5 Given a scenario, modify enterprise capabilities to enhance security

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| 5.5 | Virtual Private Networks | <p>3.2 Given a scenario, apply security principles to secure enterprise infrastructure</p> <ul style="list-style-type: none"> 3.2.2 - Secure communication/access <ul style="list-style-type: none"> 3.2.2.1 - Virtual private network (VPN) 3.2.2.2 - Remote access 3.2.2.3 - Tunneling 3.2.2.3.1 - Transport Layer Security (TLS) 3.2.2.3.2 - Internet protocol security (IPSec) 3.2.2.4 - Software-defined wide area network (SD-WAN) 3.2.2.5 - Secure access service edge (SASE) |
| 5.6 | Network Access Control | <p>4.5 Given a scenario, modify enterprise capabilities to enhance security</p> <ul style="list-style-type: none"> 4.5.10. Network access control (NAC) |
| 5.7 | Network Device Vulnerabilities | <p>2.3 Explain various types of vulnerabilities</p> <ul style="list-style-type: none"> 2.3.9 - Misconfiguration 2.3.11 - Zero-day |

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| | | <p>2.4 Given a scenario, analyze indicators of malicious activity</p> <ul style="list-style-type: none"> • 2.4.4 - Application attacks <ul style="list-style-type: none"> 2.4.4.4 - Privilege escalation <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> • 2.5.1 - Segmentation • 2.5.11 - Hardening techniques <ul style="list-style-type: none"> 2.5.11.6 - Default password changes <p>4.6 Given a scenario, implement and maintain identity and access management</p> <ul style="list-style-type: none"> • 4.6.1 - Provisioning/de-provisioning user accounts • 4.6.10 - Password concepts <ul style="list-style-type: none"> 4.6.10.1 - Password best practices <ul style="list-style-type: none"> 4.6.10.1.1 - Length 4.6.10.1.2 - Complexity 4.6.10.1.3 - Reuse 4.6.10.1.4 - Expiration 4.6.10.1.5 - Age <p>5.1 Summarize elements of effective security governance</p> <ul style="list-style-type: none"> • 5.1.3 - Standards <ul style="list-style-type: none"> 5.1.3.1 - Password |
| 5.8 | Network Applications | 1.4 Explain the importance of using appropriate cryptographic solutions |

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| | | <ul style="list-style-type: none"> • 1.4.7 - Digital signatures <p>4.3 Explain various activities associated with vulnerability management</p> <ul style="list-style-type: none"> • 4.3.1 - Identification methods <ul style="list-style-type: none"> 4.3.1.1 - Vulnerability scan 4.3.1.2 - Application security <ul style="list-style-type: none"> 4.3.1.2.1 - Static analysis 4.3.1.2.2 - Dynamic analysis 4.3.1.2.3 - Package monitoring • 4.3.3 - Vulnerability response and remediation <ul style="list-style-type: none"> 4.3.3.1 - Patching |
| <p>5.9</p> | <p>Switch Security and Attacks</p> | <p>3.2 Given a scenario, apply security principles to secure enterprise infrastructure</p> <ul style="list-style-type: none"> • 3.2.1 - Infrastructure considerations <ul style="list-style-type: none"> 3.2.1.8 - Port security <ul style="list-style-type: none"> 3.2.1.8.1 - 802.1X 3.2.1.8.2 - Extensible Authentication Protocol (EAP) <p>3.3 Compare and contrast concepts and strategies to protect data</p> <ul style="list-style-type: none"> • 3.3.4 - Methods to secure data <ul style="list-style-type: none"> 3.3.4.7 - Segmentation <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.2 - Hardening targets |

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| | | <p>4.1.2.3 - Switches</p> <ul style="list-style-type: none"> • 4.1.5 - Wireless security settings <p>4.1.5.2 - AAA/Remote Authentication Dial-In User Service (RADIUS) 4.1.5.4 - Authentication protocols</p> <p>4.5 Given a scenario, modify enterprise capabilities to enhance security</p> <ul style="list-style-type: none"> • 4.5.5 - Implementation of secure protocols |
| <p>5.10</p> | <p>Router Security</p> | <p>1.1 Compare and contrast various types of security controls</p> <ul style="list-style-type: none"> • 1.1.1 - Categories <p>1.1.1.4 - Physical</p> <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> • 2.2.10 - Default credentials <p>2.3 Explain various types of vulnerabilities</p> <ul style="list-style-type: none"> • 2.3.4 - Hardware <p>2.3.4.1 - Firmware</p> <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> • 2.5.2 - Access control <p>2.5.2.1 - Access control list (ACL) 2.5.2.2 - Permissions</p> |

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| | | <ul style="list-style-type: none"> • 2.5.11 - Hardening techniques <ul style="list-style-type: none"> 2.5.11.5 - Disabling ports/protocols 2.5.11.6 - Default password changes 3.2 Given a scenario, apply security principles to secure enterprise infrastructure <ul style="list-style-type: none"> • 3.2.2 - Secure communication/access <ul style="list-style-type: none"> 3.2.2.2 - Remote access 3.3 Compare and contrast concepts and strategies to protect data <ul style="list-style-type: none"> • 3.3.4 - Methods to secure data <ul style="list-style-type: none"> 3.3.4.7 - Segmentation 4.1 Given a scenario, apply common security techniques to computing resources <ul style="list-style-type: none"> • 4.1.2 - Hardening targets <ul style="list-style-type: none"> 4.1.2.4 - Routers 4.5 Given a scenario, modify enterprise capabilities to enhance security <ul style="list-style-type: none"> • 4.5.5 - Implementation of secure protocols <ul style="list-style-type: none"> 4.5.5.1 - Protocol selection 5.1 Summarize elements of effective security governance <ul style="list-style-type: none"> • 5.1.3 - Standards <ul style="list-style-type: none"> 5.1.3.2 - Access control |
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| 6.0 | Resiliency and Site Security | |
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| 6.1 | Physical Threats | <p>1.2 Summarize fundamental security concepts</p> <ul style="list-style-type: none"> • 1.2.6 - Physical security <ul style="list-style-type: none"> 1.2.6.1 - Bollards 1.2.6.2 - Access control vestibule 1.2.6.3 - Fencing 1.2.6.4 - Video surveillance 1.2.6.5 - Security guard 1.2.6.6 - Access badge 1.2.6.7 - Lighting 1.2.6.8 - Sensors <ul style="list-style-type: none"> 1.2.6.8.1 - Infrared 1.2.6.8.2 - Pressure 1.2.6.8.3 - Microwave 1.2.6.8.4 - Ultrasonic <p>2.4 Given a scenario, analyze indicators of malicious activity</p> <ul style="list-style-type: none"> • 2.4.2 - Physical attacks <ul style="list-style-type: none"> 2.4.2.1 - Brute force 2.4.2.2 - Radio frequency identification (RFID) cloning 2.4.2.3 - Environmental <p>3.4 Explain the importance of resilience and recovery in security architecture</p> <ul style="list-style-type: none"> • 3.4.9 - Power <p>4.6 Given a scenario, implement and maintain identity and access management</p> <ul style="list-style-type: none"> • 4.6.9 - Multifactor authentication |

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| | | 4.6.9.1.1 - Biometrics |
| 6.2 | Monitoring and Reconnaissance | <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> • 2.2.8 - Unsecure networks • 2.2.9 - Open service ports <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> • 2.5.7 - Monitoring <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.8. Monitoring <p>4.3 Explain various activities associated with vulnerability management</p> <ul style="list-style-type: none"> • 4.3.1 - Identification methods <ul style="list-style-type: none"> <li style="padding-left: 20px;">4.3.1.3.1 - Open-source intelligence (OSINT) <p>4.4 Explain security alerting and monitoring concepts and tools</p> <ul style="list-style-type: none"> • 4.4.1 - Monitoring computing resources <ul style="list-style-type: none"> <li style="padding-left: 20px;">4.4.1.1 - Systems <li style="padding-left: 20px;">4.4.1.3 - Infrastructure • 4.4.3 - Tools <ul style="list-style-type: none"> <li style="padding-left: 20px;">4.4.3.6 - Vulnerability scanners |

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| | | <p>4.5 Given a scenario, modify enterprise capabilities to enhance security</p> <ul style="list-style-type: none"> • 4.5.1 - Firewall <ul style="list-style-type: none"> 4.5.1.3 - Ports/protocols <p>4.9 Given a scenario, use data sources to support an investigation</p> <ul style="list-style-type: none"> • 4.9.2 - Data sources <ul style="list-style-type: none"> 4.9.2.4 - Packet captures <p>5.4 Summarize elements of effective security compliance</p> <ul style="list-style-type: none"> • 5.4.3 - Compliance monitoring <p>5.5 Explain types and purposes of audits and assessments</p> <ul style="list-style-type: none"> • 5.5.2 - Internal <ul style="list-style-type: none"> 5.5.2.1 - Compliance • 5.5.4 - Penetration testing <ul style="list-style-type: none"> 5.5.4.8 - Reconnaissance <ul style="list-style-type: none"> 5.5.4.8.1 - Passive 5.5.4.8.2 - Active |
| <p>6.3</p> | <p>Intrusion Detection</p> | <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> • 2.5.11 - Hardening techniques <ul style="list-style-type: none"> 2.5.11.4 - Host-based intrusion prevention system (HIPS) |

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| | | <p>3.2 Given a scenario, apply security principles to secure enterprise infrastructure</p> <ul style="list-style-type: none"> • 3.2.1 - Infrastructure considerations <ul style="list-style-type: none"> 3.2.1.6.2 - Inline vs. tap/monitor 3.2.1.7.3 - Intrusion prevention system (IPS)/intrusion detection system (IDS) 3.2.1.7.5 - Sensors <p>4.3 Explain various activities associated with vulnerability management</p> <ul style="list-style-type: none"> • 4.3.2 - Analysis <ul style="list-style-type: none"> 4.3.2.1 - Confirmation <ul style="list-style-type: none"> 4.3.2.1.1 - False positive 4.3.2.1.2 - False negative <p>4.5 Given a scenario, modify enterprise capabilities to enhance security</p> <ul style="list-style-type: none"> • 4.5.2 - IDS/IPS <ul style="list-style-type: none"> 4.5.2.1 - Trends 4.5.2.2 - Signatures • 4.5.12. User behavior analytics <p>5.6 Given a scenario, implement security awareness practices</p> <ul style="list-style-type: none"> • 5.6.2 - Anomalous behavior recognition <ul style="list-style-type: none"> 5.6.2.2 - Unexpected |
| 6.4 | Protocol Analyzers | 2.4 Given a scenario, analyze indicators of malicious activity |

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| | | <ul style="list-style-type: none"> • 2.4.3 - Network attacks <ul style="list-style-type: none"> 2.4.3.4 - On-path 2.4.3.5 - Credential replay <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> • 2.5.11 - Hardening techniques <ul style="list-style-type: none"> 2.5.11.5 - Disabling ports/protocols <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.8. Monitoring <p>4.5 Given a scenario, modify enterprise capabilities to enhance security</p> <ul style="list-style-type: none"> • 4.5.1 - Firewall <ul style="list-style-type: none"> 4.5.1.3 - Ports/protocols • 4.5.5 - Implementation of secure protocols <p>4.9 Given a scenario, use data sources to support an investigation</p> <ul style="list-style-type: none"> • 4.9.2 - Data sources <ul style="list-style-type: none"> 4.9.2.4 - Packet captures |
| 6.5 | Analyzing Network Attacks | <p>2.1 Compare and contrast common threat actors and motivations</p> <ul style="list-style-type: none"> • 2.1.3 - Motivations |

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| | | <p style="text-align: center;">2.1.3.1 - Data exfiltration</p> <p>2.4 Given a scenario, analyze indicators of malicious activity</p> <ul style="list-style-type: none"> • 2.4.3 - Network attacks <ul style="list-style-type: none"> 2.4.3.1 - Distributed denial-of-service (DDoS) <ul style="list-style-type: none"> 2.4.3.1.1 - Amplified 2.4.3.1.2 - Reflected 2.4.3.2 - Domain Name System (DNS) attacks 2.4.3.3 - Wireless 2.4.3.4 - On-path 2.4.3.5 - Credential replay 2.4.3.6 - Malicious code • 2.4.4 - Application attacks <ul style="list-style-type: none"> 2.4.4.4 - Privilege escalation <p>4.7 Explain the importance of automation and orchestration related to secure operations</p> <ul style="list-style-type: none"> • 4.7.1 - Use cases of automation and scripting <p>4.9 Given a scenario, use data sources to support an investigation</p> <ul style="list-style-type: none"> • 4.9.2 - Data sources <ul style="list-style-type: none"> 4.9.2.4 - Packet captures <p>5.5 Explain types and purposes of audits and assessments</p> <ul style="list-style-type: none"> • 5.5.4 - Penetration testing <ul style="list-style-type: none"> 5.5.4.8 - Reconnaissance |
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| 6.6 | Analyzing Password Attacks | <p>1.4 Explain the importance of using appropriate cryptographic solutions</p> <ul style="list-style-type: none"> • 1.4.5 - Hashing • 1.4.6 - Salting <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> • 2.2.10 - Default credentials • 2.2.12 - Human vectors/social engineering <p>2.4 Given a scenario, analyze indicators of malicious activity</p> <ul style="list-style-type: none"> • 2.4.6 - Password attacks <ul style="list-style-type: none"> 2.4.6.1 - Spraying 2.4.6.2 - Brute force <p>5.6 Given a scenario, implement security awareness practices</p> <ul style="list-style-type: none"> • 5.6.3 - User guidance and training <ul style="list-style-type: none"> 5.6.3.4 - Password management |
| 7.0 | Vulnerability Management | |
| 7.1 | Vulnerability Management | <p>1.1 Compare and contrast various types of security controls</p> <ul style="list-style-type: none"> • 1.1.2 - Control types <ul style="list-style-type: none"> 1.1.2.5 - Compensating |

2.3 Explain various types of vulnerabilities

- 2.3.2 - Operating system (OS)-based
- 2.3.4 - Hardware

- 2.3.4.1 - Firmware
 - 2.3.4.2 - End-of-life
 - 2.3.4.3 - Legacy

4.3 Explain various activities associated with vulnerability management

- 4.3.1 - Identification methods

- 4.3.1.1 - Vulnerability scan
 - 4.3.1.3 - Threat feed
 - 4.3.1.3.1 - Open-source intelligence (OSINT)
 - 4.3.1.3.2 - Proprietary/third-party
 - 4.3.1.3.3 - Information-sharing organization
 - 4.3.1.3.4 - Dark web
 - 4.3.1.4 - Penetration testing
 - 4.3.1.5 - Responsible disclosure program
 - 4.3.1.5.1 - Bug bounty program
 - 4.3.1.6 - System/process audit

- 4.3.2 - Analysis

- 4.3.2.1 - Confirmation
 - 4.3.2.2 - Prioritize
 - 4.3.2.3 - Common Vulnerability Scoring System (CVSS)
 - 4.3.2.4 - Common Vulnerability Enumeration (CVE)
 - 4.3.2.5 - Vulnerability classification
 - 4.3.2.6 - Exposure factor
 - 4.3.2.7 - Environmental variables
 - 4.3.2.8 - Industry/organizational impact
 - 4.3.2.9 - Risk tolerance

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| | | <ul style="list-style-type: none"> • 4.3.3 - Vulnerability response and remediation <ul style="list-style-type: none"> 4.3.3.1 - Patching 4.3.3.2 - Insurance 4.3.3.3 - Segmentation 4.3.3.4 - Compensating controls 4.3.3.5 - Exceptions and exemptions • 4.3.4 - Validation of remediation <ul style="list-style-type: none"> 4.3.4.1 - Rescanning 4.3.4.2 - Audit 4.3.4.3 - Verification <p>4.4 Explain security alerting and monitoring concepts and tools</p> <ul style="list-style-type: none"> • 4.4.3 - Tools <ul style="list-style-type: none"> 4.4.3.6 - Vulnerability scanners <p>4.8 Explain appropriate incident response activities</p> <ul style="list-style-type: none"> • 4.8.5 - Threat hunting <p>4.9 Given a scenario, use data sources to support an investigation</p> <ul style="list-style-type: none"> • 4.9.2 - Data sources <ul style="list-style-type: none"> 4.9.2.1 - Vulnerability scans |
| 7.2 | Vulnerability Scanning | <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> • 2.2.6 - Vulnerable software |

4.3 Explain various activities associated with vulnerability management

- 4.3.1 - Identification methods

 - 4.3.1.1 - Vulnerability scan

 - 4.3.1.2 - Application security

 - 4.3.1.2.1 - Static analysis

 - 4.3.1.2.2 - Dynamic analysis

 - 4.3.1.2.3 - Package monitoring

- 4.3.2 - Analysis

 - 4.3.2.4 - Common Vulnerability Enumeration (CVE)

 - 4.3.2.5 - Vulnerability classification

4.4 Explain security alerting and monitoring concepts and tools

- 4.4.1 - Monitoring computing resources

 - 4.4.1.1 - Systems

 - 4.4.1.2 - Applications

 - 4.4.1.3 - Infrastructure

- 4.4.2 - Activities

 - 4.4.2.3 - Scanning

 - 4.4.2.4 - Reporting

- 4.4.3 - Tools

 - 4.4.3.6 - Vulnerability scanners

4.9 Given a scenario, use data sources to support an investigation

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| | | <ul style="list-style-type: none"> 4.9.2 - Data sources <ul style="list-style-type: none"> 4.9.2.3 - Dashboards |
| 7.3 | Alerting and Monitoring | <p>1.4 Explain the importance of using appropriate cryptographic solutions</p> <ul style="list-style-type: none"> 1.4.4 - Obfuscation <ul style="list-style-type: none"> 1.4.4.2 - Tokenization 1.4.4.3 - Data masking <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> 2.5.7 - Monitoring <p>3.2 Given a scenario, apply security principles to secure enterprise infrastructure</p> <ul style="list-style-type: none"> 3.2.1 - Infrastructure considerations <ul style="list-style-type: none"> 3.2.1.7.5 - Sensors <p>3.3 Compare and contrast concepts and strategies to protect data</p> <ul style="list-style-type: none"> 3.3.3 - General data considerations <ul style="list-style-type: none"> 3.3.3.1.1 - Data at rest 3.3.3.1.2 - Data in transit 3.3.3.1.3 - Data in use 3.3.4 - Methods to secure data <ul style="list-style-type: none"> 3.3.4.2 - Encryption 3.3.4.4 - Masking 3.3.4.5 - Tokenization |

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| | | <p>3.3.4.8 - Permission restrictions</p> <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.8. Monitoring <p>4.3 Explain various activities associated with vulnerability management</p> <ul style="list-style-type: none"> • 4.3.1 - Identification methods <ul style="list-style-type: none"> 4.3.1.1 - Vulnerability scan <p>4.4 Explain security alerting and monitoring concepts and tools</p> <ul style="list-style-type: none"> • 4.4.1 - Monitoring computing resources <ul style="list-style-type: none"> 4.4.1.1 - Systems 4.4.1.3 - Infrastructure • 4.4.2 - Activities <ul style="list-style-type: none"> 4.4.2.1 - Log aggregation 4.4.2.2 - Alerting 4.4.2.4 - Reporting 4.4.2.5 - Archiving 4.4.2.6 - Alert response and remediation/validation 4.4.2.6.2 - Alert tuning • 4.4.3 - Tools <ul style="list-style-type: none"> 4.4.3.1 - Security Content Automation Protocol (SCAP) 4.4.3.2 - Benchmarks 4.4.3.3 - Agents/agentless <ul style="list-style-type: none"> 4.4.3.3.1 - Security information and event management (SIEM) 4.4.3.3.2 - Antivirus 4.4.3.3.3 - Data loss prevention (DLP) |
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| | | <p>4.4.3.4 - Simple Network Management Protocol (SNMP) traps 4.4.3.5 - NetFlow 4.4.3.6 - Vulnerability scanners</p> <p>4.9 Given a scenario, use data sources to support an investigation</p> <ul style="list-style-type: none"> • 4.9.1 - Log data <ul style="list-style-type: none"> 4.9.1.1 - Firewall logs 4.9.1.3 - Endpoint logs 4.9.1.4 - OS-specific security logs 4.9.1.5 - IPS/IDS logs 4.9.1.6 - Network logs • 4.9.2 - Data sources <ul style="list-style-type: none"> 4.9.2.3 - Dashboards <p>5.1 Summarize elements of effective security governance</p> <ul style="list-style-type: none"> • 5.1.4 - Procedures <ul style="list-style-type: none"> 5.1.4.3 - Playbooks <p>5.6 Given a scenario, implement security awareness practices</p> <ul style="list-style-type: none"> • 5.6.4 - Reporting and monitoring |
| <p>7.4</p> | <p>Penetration Testing</p> | <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> • 2.2.12 - Human vectors/social engineering <p>4.3 Explain various activities associated with vulnerability management</p> |

- 4.3.1 - Identification methods

- 4.3.1.3.1 - Open-source intelligence (OSINT)

- 4.3.1.4 - Penetration testing

- 4.3.1.5.1 - Bug bounty program

4.4 Explain security alerting and monitoring concepts and tools

- 4.4.3 - Tools

- 4.4.3.6 - Vulnerability scanners

5.3 Explain the processes associated with third-party risk assessment and management

- 5.3.3 - Agreement types

- 5.3.3.5 - Work order (WO)/statement of work (SOW)

- 5.3.6 - Rules of engagement

5.5 Explain types and purposes of audits and assessments

- 5.5.4 - Penetration testing

- 5.5.4.1 - Physical

- 5.5.4.2 - Offensive

- 5.5.4.3 - Defensive

- 5.5.4.4 - Integrated

- 5.5.4.5 - Known environment

- 5.5.4.6 - Partially known environment

- 5.5.4.7 - Unknown environment

- 5.5.4.8 - Reconnaissance

- 5.5.4.8.1 - Passive

- 5.5.4.8.2 - Active

| 8.0 | Network and Endpoint Security | |
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| 8.1 | Operating System Hardening | <p>1.4 Explain the importance of using appropriate cryptographic solutions</p> <ul style="list-style-type: none"> • 1.4.2 - Encryption <ul style="list-style-type: none"> 1.4.2.1.1 - Full-disk <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> • 2.2.5 - Removable device <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> • 2.5.2 - Access control • 2.5.3 - Application allow list • 2.5.5 - Patching • 2.5.6 - Encryption • 2.5.7 - Monitoring • 2.5.8 - Least privilege • 2.5.9 - Configuration enforcement • 2.5.10 - Decommissioning • 2.5.11 - Hardening techniques <ul style="list-style-type: none"> 2.5.11.2 - Installation of endpoint protection 2.5.11.3 - Host-based firewall 2.5.11.5 - Disabling ports/protocols 2.5.11.6 - Default password changes 2.5.11.7 - Removal of unnecessary software |

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| | | <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.1 - Secure baselines <ul style="list-style-type: none"> 4.1.1.1 - Establish 4.1.1.2 - Deploy 4.1.1.3 - Maintain • 4.1.2 - Hardening targets <ul style="list-style-type: none"> 4.1.2.2 - Workstations <p>4.3 Explain various activities associated with vulnerability management</p> <ul style="list-style-type: none"> • 4.3.3 - Vulnerability response and remediation <ul style="list-style-type: none"> 4.3.3.1 - Patching <p>4.5 Given a scenario, modify enterprise capabilities to enhance security</p> <ul style="list-style-type: none"> • 4.5.4 - Operating system security <ul style="list-style-type: none"> 4.5.4.1 - Group Policy <p>4.6 Given a scenario, implement and maintain identity and access management</p> <ul style="list-style-type: none"> • 4.6.1 - Provisioning/de-provisioning user accounts • 4.6.8 - Access controls <ul style="list-style-type: none"> 4.6.8.7 - Least privilege • 4.6.9 - Multifactor authentication |
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| | | <p>4.7 Explain the importance of automation and orchestration related to secure operations</p> <ul style="list-style-type: none"> 4.7.1 - Use cases of automation and scripting <ul style="list-style-type: none"> 4.7.1.4 - Security groups |
| 8.2 | File Server Security | <p>1.2 Summarize fundamental security concepts</p> <ul style="list-style-type: none"> 1.2.6 - Physical security <p>1.4 Explain the importance of using appropriate cryptographic solutions</p> <ul style="list-style-type: none"> 1.4.2 - Encryption <ul style="list-style-type: none"> 1.4.2.1.1 - Full-disk 1.4.2.1.3 - File <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> 2.2.3 - File-based <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> 2.5.2 - Access control <ul style="list-style-type: none"> 2.5.2.1 - Access control list (ACL) 2.5.2.2 - Permissions 2.5.8 - Least privilege 2.5.11 - Hardening techniques <ul style="list-style-type: none"> 2.5.11.7 - Removal of unnecessary software |

3.2 Given a scenario, apply security principles to secure enterprise infrastructure

- 3.2.2 - Secure communication/access

3.2.2.1 - Virtual private network (VPN)

3.2.2.3.2 - Internet protocol security (IPSec)

4.1 Given a scenario, apply common security techniques to computing resources

- 4.1.2 - Hardening targets

4.1.2.6 - Servers

4.2 Explain the security implications of proper hardware, software, and data asset management

- 4.2.1 - Acquisition/procurement process

4.3 Explain various activities associated with vulnerability management

- 4.3.1 - Identification methods

4.3.1.6 - System/process audit

4.5 Given a scenario, modify enterprise capabilities to enhance security

- 4.5.5 - Implementation of secure protocols
- 4.5.8. File integrity monitoring

4.6 Given a scenario, implement and maintain identity and access management

- 4.6.1 - Provisioning/de-provisioning user accounts
- 4.6.8 - Access controls

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| | | 4.6.8.7 - Least privilege |
| 8.3 | Linux Host Security | <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> 2.2.5 - Removable device <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> 2.5.5 - Patching 2.5.11 - Hardening techniques <ul style="list-style-type: none"> 2.5.11.3 - Host-based firewall 2.5.11.4 - Host-based intrusion prevention system (HIPS) 2.5.11.5 - Disabling ports/protocols 2.5.11.7 - Removal of unnecessary software |
| 8.4 | Wireless Overview | <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> 4.1.3. Wireless devices <ul style="list-style-type: none"> 4.1.3.1 - Installation considerations <ul style="list-style-type: none"> 4.1.3.1.1 - Site surveys 4.1.3.1.2 - Heat maps 4.1.5 - Wireless security settings <ul style="list-style-type: none"> 4.1.5.1 - Wi-Fi Protected Access 3 (WPA3) 4.1.5.2 - AAA/Remote Authentication Dial-In User Service (RADIUS) |
| 8.5 | Wireless Attacks | <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> 2.2.8 - Unsecure networks |

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| | | <p>2.2.8.1 - Wireless 2.2.8.3 - Bluetooth</p> <p>2.4 Given a scenario, analyze indicators of malicious activity</p> <ul style="list-style-type: none"> 2.4.2 - Physical attacks <ul style="list-style-type: none"> 2.4.2.2 - Radio frequency identification (RFID) cloning 2.4.3 - Network attacks <ul style="list-style-type: none"> 2.4.3.3 - Wireless 2.4.3.5 - Credential replay <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> 4.1.3. Wireless devices <ul style="list-style-type: none"> 4.1.3.1 - Installation considerations 4.1.5 - Wireless security settings <ul style="list-style-type: none"> 4.1.5.1 - Wi-Fi Protected Access 3 (WPA3) 4.1.5.4 - Authentication protocols |
| 8.6 | Wireless Defenses | <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> 2.2.8 - Unsecure networks <ul style="list-style-type: none"> 2.2.8.1 - Wireless 2.2.10 - Default credentials |

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| | | <p>2.3 Explain various types of vulnerabilities</p> <ul style="list-style-type: none"> • 2.3.4 - Hardware <ul style="list-style-type: none"> 2.3.4.1 - Firmware <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> • 2.5.11 - Hardening techniques <ul style="list-style-type: none"> 2.5.11.6 - Default password changes <p>3.2 Given a scenario, apply security principles to secure enterprise infrastructure</p> <ul style="list-style-type: none"> • 3.2.1 - Infrastructure considerations <ul style="list-style-type: none"> 3.2.1.7.3 - Intrusion prevention system (IPS)/intrusion detection system (IDS) 3.2.1.8 - Port security <ul style="list-style-type: none"> 3.2.1.8.1 - 802.1X 3.2.1.8.2 - Extensible Authentication Protocol (EAP) • 3.2.2 - Secure communication/access <ul style="list-style-type: none"> 3.2.2.3.1 - Transport Layer Security (TLS) <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.3. Wireless devices <ul style="list-style-type: none"> 4.1.3.1 - Installation considerations • 4.1.5 - Wireless security settings |
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| | | <p>4.1.5.1 - Wi-Fi Protected Access 3 (WPA3) 4.1.5.2 - AAA/Remote Authentication Dial-In User Service (RADIUS) 4.1.5.3 - Cryptographic protocols 4.1.5.4 - Authentication protocols</p> |
| 8.7 | Data Transmission Security | <p>1.4 Explain the importance of using appropriate cryptographic solutions</p> <ul style="list-style-type: none"> • 1.4.2 - Encryption <ul style="list-style-type: none"> 1.4.2.2 - Transport/communication 1.4.2.3 - Asymmetric 1.4.2.5 - Key exchange • 1.4.11 - Certificates <ul style="list-style-type: none"> 1.4.11.1 - Certificate authorities <p>2.4 Given a scenario, analyze indicators of malicious activity</p> <ul style="list-style-type: none"> • 2.4.3 - Network attacks <ul style="list-style-type: none"> 2.4.3.2 - Domain Name System (DNS) attacks <p>3.2 Given a scenario, apply security principles to secure enterprise infrastructure</p> <ul style="list-style-type: none"> • 3.2.2 - Secure communication/access <ul style="list-style-type: none"> 3.2.2.1 - Virtual private network (VPN) 3.2.2.2 - Remote access 3.2.2.3 - Tunneling <ul style="list-style-type: none"> 3.2.2.3.1 - Transport Layer Security (TLS) 3.2.2.3.2 - Internet protocol security (IPSec) |

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| 8.8 | Web Application Security | <p>2.3 Explain various types of vulnerabilities</p> <ul style="list-style-type: none"> • 2.3.1 - Application <ul style="list-style-type: none"> 2.3.1.1 - Memory injection 2.3.1.2 - Buffer overflow 2.3.1.3 - Race conditions <ul style="list-style-type: none"> 2.3.1.3.1 - Time-of-check (TOC) 2.3.1.3.2 - Time-of-use (TOU) 2.3.1.4 - Malicious update • 2.3.3 - Web-based <ul style="list-style-type: none"> 2.3.3.1 - Structured Query Language injection (SQLi) 2.3.3.2 - Cross-site scripting (XSS) • 2.3.4 - Hardware • 2.3.11 - Zero-day <p>2.4 Given a scenario, analyze indicators of malicious activity</p> <ul style="list-style-type: none"> • 2.4.3 - Network attacks <ul style="list-style-type: none"> 2.4.3.5 - Credential replay • 2.4.4 - Application attacks <ul style="list-style-type: none"> 2.4.4.1 - Injection 2.4.4.2 - Buffer overflow 2.4.4.3 - Replay 2.4.4.4 - Privilege escalation 2.4.4.5 - Forgery 2.4.4.6 - Directory traversal <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> |
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| | | <ul style="list-style-type: none"> • 2.5.5 - Patching <p>3.2 Given a scenario, apply security principles to secure enterprise infrastructure</p> <ul style="list-style-type: none"> • 3.2.1 - Infrastructure considerations <ul style="list-style-type: none"> 3.2.1.7.3 - Intrusion prevention system (IPS)/intrusion detection system (IDS) <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.6 - Application security <ul style="list-style-type: none"> 4.1.6.2 - Secure cookies <p>4.6 Given a scenario, implement and maintain identity and access management</p> <ul style="list-style-type: none"> • 4.6.5 - Single sign-on (SSO) <ul style="list-style-type: none"> 4.6.5.1 - Lightweight Directory Access Protocol (LDAP) |
| 8.9 | Application Development and Security | <p>1.3 Explain the importance of change management processes and the impact to security</p> <ul style="list-style-type: none"> • 1.3.4 -Version control <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> • 2.2.7 - Unsupported systems and applications <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> • 2.5.2 - Access control |

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| | | <p style="text-align: center;">2.5.2.2 - Permissions</p> <ul style="list-style-type: none"> • 2.5.3 - Application allow list • 2.5.5 - Patching • 2.5.7 - Monitoring • 2.5.11 - Hardening techniques <ul style="list-style-type: none"> <li style="padding-left: 20px;">2.5.11.2 - Installation of endpoint protection <li style="padding-left: 20px;">2.5.11.3 - Host-based firewall <li style="padding-left: 20px;">2.5.11.7 - Removal of unnecessary software <p>3.3 Compare and contrast concepts and strategies to protect data</p> <ul style="list-style-type: none"> • 3.3.4 - Methods to secure data <ul style="list-style-type: none"> <li style="padding-left: 20px;">3.3.4.6 - Obfuscation <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.1 - Secure baselines <ul style="list-style-type: none"> <li style="padding-left: 20px;">4.1.1.1 - Establish • 4.1.6 - Application security <ul style="list-style-type: none"> <li style="padding-left: 20px;">4.1.6.1 - Input validation <li style="padding-left: 20px;">4.1.6.2 - Secure cookies <li style="padding-left: 20px;">4.1.6.3 - Static code analysis <li style="padding-left: 20px;">4.1.6.4 - Code signing • 4.1.7. Sandboxing |
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4.3 Explain various activities associated with vulnerability management

- 4.3.1 - Identification methods

4.3.1.2 - Application security

4.3.1.2.1 - Static analysis

4.3.1.2.2 - Dynamic analysis

4.5 Given a scenario, modify enterprise capabilities to enhance security

- 4.5.4 - Operating system security

4.5.4.2 - SELinux

4.6 Given a scenario, implement and maintain identity and access management

- 4.6.1 - Provisioning/de-provisioning user accounts

- 4.6.8 - Access controls

4.6.8.7 - Least privilege

4.7 Explain the importance of automation and orchestration related to secure operations

- 4.7.1 - Use cases of automation and scripting

4.7.1.1 - User provisioning

4.7.1.2 - Resource provisioning

4.7.1.4 - Security groups

4.7.1.5 - Ticket creation

4.7.1.7 - Enabling/disabling services and access

4.7.1.9 - Integrations and Application programming interfaces (APIs)

- 4.7.2 - Benefits

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| | | <p>4.7.2.1 - Efficiency/time saving 4.7.2.2 - Enforcing baselines 4.7.2.5 - Staff retention</p> <ul style="list-style-type: none"> 4.7.3 - Other considerations <ul style="list-style-type: none"> 4.7.3.1 - Complexity 4.7.3.2 - Cost 4.7.3.3 - Single point of failure 4.7.3.4 - Technical debt 4.7.3.5 - Ongoing supportability <p>5.1 Summarize elements of effective security governance</p> <ul style="list-style-type: none"> 5.1.2 - Policies <ul style="list-style-type: none"> 5.1.2.6 - Software development lifecycle (SDLC) <p>5.2 Explain elements of the risk management process</p> <ul style="list-style-type: none"> 5.2.3 - Risk analysis <ul style="list-style-type: none"> 5.2.3.8 - Exposure factor |
| 9.0 | Incident Response | |
| 9.1 | Incident Response and Mitigation | <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> 2.5.1 - Segmentation 2.5.4 - Isolation <p>4.8 Explain appropriate incident response activities</p> |

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| | | <ul style="list-style-type: none"> • 4.8.1 - Process <ul style="list-style-type: none"> 4.8.1.1 - Preparation 4.8.1.2 - Detection 4.8.1.3 - Analysis 4.8.1.4 - Containment 4.8.1.5 - Eradication 4.8.1.6 - Recovery 4.8.1.7 - Lessons learned <p>5.1 Summarize elements of effective security governance</p> <ul style="list-style-type: none"> • 5.1.4 - Procedures <ul style="list-style-type: none"> 5.1.4.3 - Playbooks |
| <p>9.2</p> | <p>Log Management</p> | <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> • 2.5.7 - Monitoring <p>3.2 Given a scenario, apply security principles to secure enterprise infrastructure</p> <ul style="list-style-type: none"> • 3.2.1 - Infrastructure considerations <ul style="list-style-type: none"> 3.2.1.7.3 - Intrusion prevention system (IPS)/intrusion detection system (IDS) 3.2.1.7.5 - Sensors <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.1 - Secure baselines <ul style="list-style-type: none"> 4.1.1.1 - Establish |

4.3 Explain various activities associated with vulnerability management

- 4.3.1 - Identification methods

- 4.3.1.1 - Vulnerability scan

- 4.3.2 - Analysis

- 4.3.2.4 - Common Vulnerability Enumeration (CVE)

4.4 Explain security alerting and monitoring concepts and tools

- 4.4.2 - Activities

- 4.4.2.1 - Log aggregation

- 4.4.2.2 - Alerting

- 4.4.3 - Tools

- 4.4.3.3.1 - Security information and event management (SIEM)

- 4.4.3.5 - NetFlow

- 4.4.3.6 - Vulnerability scanners

4.9 Given a scenario, use data sources to support an investigation

- 4.9.1 - Log data

- 4.9.1.1 - Firewall logs

- 4.9.1.2 - Application logs

- 4.9.1.3 - Endpoint logs

- 4.9.1.4 - OS-specific security logs

- 4.9.1.5 - IPS/IDS logs

- 4.9.1.6 - Network logs

- 4.9.1.7 - Metadata

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| | | <ul style="list-style-type: none"> 4.9.2 - Data sources <ul style="list-style-type: none"> 4.9.2.3 - Dashboards 4.9.2.4 - Packet captures |
| 9.3 | Digital Forensics | <p>4.8 Explain appropriate incident response activities</p> <ul style="list-style-type: none"> 4.8.6 - Digital forensics <ul style="list-style-type: none"> 4.8.6.1 - Legal hold 4.8.6.2 - Chain of custody 4.8.6.3 - Acquisition 4.8.6.4 - Reporting 4.8.6.5 - Preservation 4.8.6.6 - E-discovery <p>4.9 Given a scenario, use data sources to support an investigation</p> <ul style="list-style-type: none"> 4.9.2 - Data sources <ul style="list-style-type: none"> 4.9.2.1 - Vulnerability scans 4.9.2.3 - Dashboards 4.9.2.4 - Packet captures |
| 9.4 | Redundancy | <p>3.1 Compare and contrast security implications of different architecture models</p> <ul style="list-style-type: none"> 3.1.1 - Architecture and infrastructure concepts <ul style="list-style-type: none"> 3.1.1.1.3 - Third-party vendors 3.1.1.5 - Network infrastructure 3.1.1.14 - High availability 3.1.2 - Considerations |

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| | | <p>3.1.2.11 - Power</p> <p>3.2 Given a scenario, apply security principles to secure enterprise infrastructure</p> <ul style="list-style-type: none"> 3.2.1 - Infrastructure considerations <ul style="list-style-type: none"> 3.2.1.6.1 - Active vs. passive 3.2.1.7.4 - Load balancer <p>3.4 Explain the importance of resilience and recovery in security architecture</p> <ul style="list-style-type: none"> 3.4.1 - High availability <ul style="list-style-type: none"> 3.4.1.1 - Load balancing vs. clustering 3.4.2 - Site considerations <ul style="list-style-type: none"> 3.4.2.4 - Geographic dispersion 3.4.9 - Power <ul style="list-style-type: none"> 3.4.9.1 - Generators 3.4.9.2 - Uninterruptible power supply (UPS) <p>5.3 Explain the processes associated with third-party risk assessment and management</p> <ul style="list-style-type: none"> 5.3.2 - Vendor selection |
| <p>9.5</p> | <p>Backup and Restore</p> | <p>3.4 Explain the importance of resilience and recovery in security architecture</p> <ul style="list-style-type: none"> 3.4.8 - Backups <ul style="list-style-type: none"> 3.4.8.1 - Onsite/offsite 3.4.8.2 - Frequency |

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| | | <p>3.4.8.3 - Encryption 3.4.8.4 - Snapshots 3.4.8.5 - Recovery 3.4.8.6 - Replication 3.4.8.7 - Journaling</p> |
| 10.0 | Protocol, App, and Cloud Security | |
| 10.1 | Host Virtualization | <p>2.3 Explain various types of vulnerabilities</p> <ul style="list-style-type: none"> 2.3.5 - Virtualization <ul style="list-style-type: none"> 2.3.5.1 - Virtual machine (VM) escape 2.3.5.2 - Resource reuse <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> 2.5.1 - Segmentation <p>3.1 Compare and contrast security implications of different architecture models</p> <ul style="list-style-type: none"> 3.1.1 - Architecture and infrastructure concepts <ul style="list-style-type: none"> 3.1.1.5 - Network infrastructure <ul style="list-style-type: none"> 3.1.1.5.2 - Logical segmentation 3.1.1.8 - Containerization 3.1.1.9 - Virtualization <p>3.2 Given a scenario, apply security principles to secure enterprise infrastructure</p> <ul style="list-style-type: none"> 3.2.1 - Infrastructure considerations <ul style="list-style-type: none"> 3.2.1.7.4 - Load balancer |

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| | | <p>3.4 Explain the importance of resilience and recovery in security architecture</p> <ul style="list-style-type: none"> • 3.4.1 - High availability <ul style="list-style-type: none"> 3.4.1.1 - Load balancing vs. clustering <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.7. Sandboxing <p>4.3 Explain various activities associated with vulnerability management</p> <ul style="list-style-type: none"> • 4.3.1 - Identification methods <ul style="list-style-type: none"> 4.3.1.1 - Vulnerability scan |
| 10.2 | Virtual Networking | <p>3.1 Compare and contrast security implications of different architecture models</p> <ul style="list-style-type: none"> • 3.1.1 - Architecture and infrastructure concepts <ul style="list-style-type: none"> 3.1.1.5 - Network infrastructure 3.1.1.9 - Virtualization <p>3.2 Given a scenario, apply security principles to secure enterprise infrastructure</p> <ul style="list-style-type: none"> • 3.2.2 - Secure communication/access <ul style="list-style-type: none"> 3.2.2.1 - Virtual private network (VPN) <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.7. Sandboxing |

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| 10.3 | Software-Defined Networking | <p>3.1 Compare and contrast security implications of different architecture models</p> <ul style="list-style-type: none"> • 3.1.1 - Architecture and infrastructure concepts <ul style="list-style-type: none"> 3.1.1.5.3 - Software-defined networking (SDN) |
| 10.4 | Cloud Services | <p>1.2 Summarize fundamental security concepts</p> <ul style="list-style-type: none"> • 1.2.3 - Authentication, Authorization, and Accounting (AAA) <ul style="list-style-type: none"> 1.2.3.1 - Authenticating people <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> • 2.2.11 - Supply chain <ul style="list-style-type: none"> 2.2.11.1 - Managed service providers (MSPs) 2.2.11.2 - Vendors 2.2.11.3 - Suppliers <p>2.3 Explain various types of vulnerabilities</p> <ul style="list-style-type: none"> • 2.3.6 - Cloud-specific • 2.3.7 - Supply chain <ul style="list-style-type: none"> 2.3.7.1 - Service provider <p>3.1 Compare and contrast security implications of different architecture models</p> <ul style="list-style-type: none"> • 3.1.1 - Architecture and infrastructure concepts <ul style="list-style-type: none"> 3.1.1.1 - Cloud <ul style="list-style-type: none"> 3.1.1.1.2 - Hybrid considerations 3.1.1.1.3 - Third-party vendors |

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| | | <p>3.1.1.3 - Serverless 3.1.1.9 - Virtualization</p> <ul style="list-style-type: none"> 3.1.2 - Considerations <p>3.4 Explain the importance of resilience and recovery in security architecture</p> <ul style="list-style-type: none"> 3.4.4 - Multi-cloud systems <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> 4.1.2 - Hardening targets <p>4.1.2.5 - Cloud infrastructure</p> <p>5.3 Explain the processes associated with third-party risk assessment and management</p> <ul style="list-style-type: none"> 5.3.1 - Vendor assessment <p>5.3.1.1 - Penetration testing 5.3.1.2 - Right-to-audit clause 5.3.1.4 - Independent assessments</p> <ul style="list-style-type: none"> 5.3.4 - Vendor monitoring |
| 10.5 | Mobile Devices | <p>2.3 Explain various types of vulnerabilities</p> <ul style="list-style-type: none"> 2.3.10 - Mobile device <p>2.3.10.1 - Side loading 2.3.10.2 - Jailbreaking</p> <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> 2.5.3 - Application allow list |

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| | | <ul style="list-style-type: none"> • 2.5.11 - Hardening techniques <ul style="list-style-type: none"> 2.5.11.1 - Encryption 3.3 Compare and contrast concepts and strategies to protect data • 3.3.4 - Methods to secure data <ul style="list-style-type: none"> 3.3.4.2 - Encryption 4.1 Given a scenario, apply common security techniques to computing resources <ul style="list-style-type: none"> • 4.1.1 - Secure baselines <ul style="list-style-type: none"> 4.1.1.1 - Establish 4.1.1.2 - Deploy • 4.1.2 - Hardening targets <ul style="list-style-type: none"> 4.1.2.1 - Mobile devices • 4.1.3. Wireless devices <ul style="list-style-type: none"> 4.1.3.1 - Installation considerations • 4.1.4 - Mobile solutions <ul style="list-style-type: none"> 4.1.4.1 - Mobile device management (MDM) 4.1.4.2 - Deployment models <ul style="list-style-type: none"> 4.1.4.2.1 - Bring your own device (BYOD) 4.1.4.2.2 - Corporate-owned, personally enabled (COPE) 4.1.4.2.3 - Choose your own device (CYOD) 4.1.4.3 - Connections methods <ul style="list-style-type: none"> 4.1.4.3.1 - Cellular 4.1.4.3.2 - Wi-Fi |
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| | | <p>4.1.4.3.3 - Bluetooth</p> <ul style="list-style-type: none"> 4.1.6 - Application security <p>4.1.6.4 - Code signing</p> <ul style="list-style-type: none"> 4.1.7. Sandboxing <p>4.5 Given a scenario, modify enterprise capabilities to enhance security</p> <ul style="list-style-type: none"> 4.5.4 - Operating system security <p>4.5.4.1 - Group Policy</p> <p>4.6 Given a scenario, implement and maintain identity and access management</p> <ul style="list-style-type: none"> 4.6.10 - Password concepts <p>4.6.10.2 - Password managers</p> |
| <p>10.6</p> | <p>Mobile Device Management</p> | <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> 2.5.3 - Application allow list <p>3.1 Compare and contrast security implications of different architecture models</p> <ul style="list-style-type: none"> 3.1.2 - Considerations <p>3.1.2.6 - Ease of deployment</p> <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> 4.1.4 - Mobile solutions |

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| | | <p>4.1.4.1 - Mobile device management (MDM) 4.1.4.2 - Deployment models 4.1.4.2.1 - Bring your own device (BYOD)</p> <p>4.2 Explain the security implications of proper hardware, software, and data asset management</p> <ul style="list-style-type: none"> 4.2.3 - Disposal/decommissioning <ul style="list-style-type: none"> 4.2.3.1 - Sanitization 4.2.3.2 - Destruction 4.2.3.4 - Data retention |
| 10.7 | BYOD Security | <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> 2.2.8 - Unsecure networks <ul style="list-style-type: none"> 2.2.8.1 - Wireless <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> 2.5.4 - Isolation <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> 4.1.2 - Hardening targets <ul style="list-style-type: none"> 4.1.2.1 - Mobile devices 4.1.3. Wireless devices <ul style="list-style-type: none"> 4.1.3.1 - Installation considerations 4.1.4 - Mobile solutions |

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| | | <p>4.1.4.1 - Mobile device management (MDM) 4.1.4.2 - Deployment models 4.1.4.2.1 - Bring your own device (BYOD) 4.1.4.2.2 - Corporate-owned, personally enabled (COPE) 4.1.4.2.3 - Choose your own device (CYOD) 4.1.4.3.2 - Wi-Fi 4.1.4.3.3 - Bluetooth</p> <p>4.5 Given a scenario, modify enterprise capabilities to enhance security</p> <ul style="list-style-type: none"> • 4.5.10. Network access control (NAC) <p>4.6 Given a scenario, implement and maintain identity and access management</p> <ul style="list-style-type: none"> • 4.6.8 - Access controls <p>5.1 Summarize elements of effective security governance</p> <ul style="list-style-type: none"> • 5.1.2 - Policies <p style="padding-left: 40px;">5.1.2.1 - Acceptable use policy (AUP)</p> |
| <p>10.8</p> | <p>Embedded and Specialized Systems</p> | <p>1.4 Explain the importance of using appropriate cryptographic solutions</p> <ul style="list-style-type: none"> • 1.4.3 - Tools <p style="padding-left: 40px;">1.4.3.1 - Trusted Platform Module (TPM)</p> <p>2.2 Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> • 2.2.8 - Unsecure networks <p style="padding-left: 40px;">2.2.8.1 - Wireless 2.2.8.2 - Wired</p> |

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| | | <p>2.2.8.3 - Bluetooth</p> <p>3.1 Compare and contrast security implications of different architecture models</p> <ul style="list-style-type: none"> • 3.1.1 - Architecture and infrastructure concepts <ul style="list-style-type: none"> 3.1.1.10 - IoT 3.1.1.11 - Industrial control systems (ICS)/supervisory control and data acquisition (SCADA) 3.1.1.12 - Real-time operating system (RTOS) 3.1.1.13 - Embedded systems <p>3.3 Compare and contrast concepts and strategies to protect data</p> <ul style="list-style-type: none"> • 3.3.4 - Methods to secure data <ul style="list-style-type: none"> 3.3.4.2 - Encryption <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.2 - Hardening targets <ul style="list-style-type: none"> 4.1.2.1 - Mobile devices 4.1.2.7 - ICS/SCADA 4.1.2.8 - Embedded systems 4.1.2.10 - IoT devices • 4.1.4 - Mobile solutions <ul style="list-style-type: none"> 4.1.4.3.1 - Cellular 4.1.4.3.2 - Wi-Fi 4.1.4.3.3 - Bluetooth |
| 10.9 | Email | 2.4 Given a scenario, analyze indicators of malicious activity |

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| | | <ul style="list-style-type: none"> • 2.4.1 - Malware attacks <ul style="list-style-type: none"> 2.4.1.6 - Virus • 2.4.4 - Application attacks <p>3.2 Given a scenario, apply security principles to secure enterprise infrastructure</p> <ul style="list-style-type: none"> • 3.2.2 - Secure communication/access <ul style="list-style-type: none"> 3.2.2.3.1 - Transport Layer Security (TLS) <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.6 - Application security <ul style="list-style-type: none"> 4.1.6.2 - Secure cookies <p>4.5 Given a scenario, modify enterprise capabilities to enhance security</p> <ul style="list-style-type: none"> • 4.5.7 - Email security <ul style="list-style-type: none"> 4.5.7.1 - Domain-based Message Authentication Reporting and Conformance (DMARC) 4.5.7.2 - DomainKeys Identified Mail (DKIM) 4.5.7.3 - Sender Policy Framework (SPF) 4.5.7.4 - Gateway • 4.5.9. DLP <p>5.6 Given a scenario, implement security awareness practices</p> <ul style="list-style-type: none"> • 5.6.1 - Phishing |
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| 11.0 | Security Governance Concepts | |
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| 11.1 | Policies, Standards, and Procedures | <p>4.6 Given a scenario, implement and maintain identity and access management</p> <ul style="list-style-type: none"> • 4.6.9 - Multifactor authentication • 4.6.10 - Password concepts <ul style="list-style-type: none"> 4.6.10.1.1 - Length 4.6.10.1.2 - Complexity 4.6.10.1.3 - Reuse 4.6.10.1.4 - Expiration <p>5.1 Summarize elements of effective security governance</p> <ul style="list-style-type: none"> • 5.1.1 - Guidelines • 5.1.2 - Policies <ul style="list-style-type: none"> 5.1.2.1 - Acceptable use policy (AUP) 5.1.2.2 - Information security policies 5.1.2.3 - Business continuity 5.1.2.4 - Disaster recovery 5.1.2.5 - Incident response 5.1.2.6 - Software development lifecycle (SDLC) 5.1.2.7 - Change management • 5.1.3 - Standards <ul style="list-style-type: none"> 5.1.3.1 - Password 5.1.3.2 - Access control 5.1.3.3 - Physical security 5.1.3.4 - Encryption • 5.1.4 - Procedures |

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| | | <p>5.1.4.3 - Playbooks</p> <ul style="list-style-type: none"> • 5.1.5 - External considerations <ul style="list-style-type: none"> 5.1.5.1 - Regulatory 5.1.5.2 - Legal 5.1.5.3 - Industry 5.1.5.4 - Local/regional 5.1.5.5 - National 5.1.5.6 - Global • 5.1.6 - Monitoring and revision • 5.1.7 - Types of governance structures <ul style="list-style-type: none"> 5.1.7.1 - Boards 5.1.7.2 - Committees 5.1.7.3 - Government entities 5.1.7.4 - Centralized/decentralized |
| <p>11.2</p> | <p>Change Management</p> | <p>1.3 Explain the importance of change management processes and the impact to security</p> <ul style="list-style-type: none"> • 1.3.2 - Technical implications <ul style="list-style-type: none"> 1.3.2.1 - Allow lists/deny lists 1.3.2.2 - Restricted activities 1.3.2.3 - Downtime 1.3.2.4 - Service restart 1.3.2.5 - Application restart 1.3.2.6 - Legacy applications 1.3.2.7 - Dependencies • 1.3.3 - Documentation <ul style="list-style-type: none"> 1.3.3.1 - Updating diagrams |

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| | | <p>1.3.3.2 - Updating policies/procedures</p> <ul style="list-style-type: none"> • 1.3.4 -Version control <p>5.1 Summarize elements of effective security governance</p> <ul style="list-style-type: none"> • 5.1.2 - Policies <p>5.1.2.7 - Change management</p> <ul style="list-style-type: none"> • 5.1.4 - Procedures <p>5.1.4.1 - Change management</p> <ul style="list-style-type: none"> • 5.1.7 - Types of governance structures <p>5.1.7.1 - Boards</p> <p>5.2 Explain elements of the risk management process</p> <ul style="list-style-type: none"> • 5.2.3 - Risk analysis |
| <p>11.3</p> | <p>Automation and Orchestration</p> | <p>4.7 Explain the importance of automation and orchestration related to secure operations</p> <ul style="list-style-type: none"> • 4.7.1 - Use cases of automation and scripting <p>4.7.1.5 - Ticket creation 4.7.1.7 - Enabling/disabling services and access 4.7.1.8 - Continuous integration and testing</p> <ul style="list-style-type: none"> • 4.7.2 - Benefits <p>4.7.2.1 - Efficiency/time saving 4.7.2.2 - Enforcing baselines 4.7.2.3 - Standard infrastructure configurations</p> |

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| | | <p>4.7.2.5 - Staff retention 4.7.2.6 - Reaction time 4.7.2.7 - Workforce multiplier</p> <ul style="list-style-type: none"> 4.7.3 - Other considerations <ul style="list-style-type: none"> 4.7.3.1 - Complexity 4.7.3.2 - Cost 4.7.3.3 - Single point of failure 4.7.3.4 - Technical debt 4.7.3.5 - Ongoing supportability |
| 12.0 | Risk Management Processes | |
| 12.1 | Risk Management Processes and Concepts | <p>3.4 Explain the importance of resilience and recovery in security architecture</p> <ul style="list-style-type: none"> 3.4.1 - High availability 3.4.2 - Site considerations <ul style="list-style-type: none"> 3.4.2.1 - Hot 3.4.2.2 - Cold 3.4.2.3 - Warm 3.4.2.4 - Geographic dispersion 3.4.3 - Platform diversity 3.4.4 - Multi-cloud systems 3.4.5 - Continuity of operations 3.4.6 - Capacity planning <ul style="list-style-type: none"> 3.4.6.1 - People 3.4.6.2 - Technology 3.4.6.3 - Infrastructure |

- 3.4.7 - Testing

- 3.4.7.1 - Tabletop exercises
- 3.4.7.2 - Fail over
- 3.4.7.3 - Simulation
- 3.4.7.4 - Parallel processing

- 3.4.8 - Backups

4.2 Explain the security implications of proper hardware, software, and data asset management

- 4.2.2 - Assignment/accounting

5.1 Summarize elements of effective security governance

- 5.1.2 - Policies

- 5.1.2.3 - Business continuity
- 5.1.2.5 - Incident response

5.2 Explain elements of the risk management process

- 5.2.1 - Risk identification

- 5.2.2 - Risk assessment

- 5.2.2.1 - Ad hoc
- 5.2.2.2 - Recurring
- 5.2.2.3 - One-time
- 5.2.2.4 - Continuous

- 5.2.3 - Risk analysis

- 5.2.3.1 - Qualitative
- 5.2.3.2 - Quantitative

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| | | <ul style="list-style-type: none"> 5.2.3.3 - Single loss expectancy (SLE) 5.2.3.4 - Annualized loss expectancy (ALE) 5.2.3.5 - Annualized rate of occurrence (ARO) 5.2.3.6 - Probability 5.2.3.7 - Likelihood 5.2.3.8 - Exposure factor 5.2.3.9 - Impact <ul style="list-style-type: none"> • 5.2.4 - Risk register <ul style="list-style-type: none"> 5.2.4.1 - Key risk indicators 5.2.4.2 - Risk owners 5.2.4.3 - Risk threshold <ul style="list-style-type: none"> • 5.2.5 - Risk tolerance • 5.2.6 - Risk appetite <ul style="list-style-type: none"> 5.2.6.1 - Expansionary 5.2.6.2 - Conservative 5.2.6.3 - Neutral <ul style="list-style-type: none"> • 5.2.7 - Risk management strategies <ul style="list-style-type: none"> 5.2.7.1 - Transfer 5.2.7.2 - Accept <ul style="list-style-type: none"> 5.2.7.2.1 - Exemption 5.2.7.2.2 - Exception 5.2.7.3 - Avoid 5.2.7.4 - Mitigate <ul style="list-style-type: none"> • 5.2.8 - Risk reporting • 5.2.9 - Business impact analysis <ul style="list-style-type: none"> 5.2.9.1 - Recovery time objective (RTO) 5.2.9.2 - Recovery point objective (RPO) 5.2.9.3 - Mean time to repair (MTTR) |
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| | | 5.2.9.4 - Mean time between failures (MTBF) |
| 12.2 | Vendor Management | <p>5.1 Summarize elements of effective security governance</p> <ul style="list-style-type: none"> • 5.1.4 - Procedures <ul style="list-style-type: none"> 5.1.4.2 - Onboarding/offboarding <p>5.3 Explain the processes associated with third-party risk assessment and management</p> <ul style="list-style-type: none"> • 5.3.1 - Vendor assessment <ul style="list-style-type: none"> 5.3.1.1 - Penetration testing 5.3.1.2 - Right-to-audit clause 5.3.1.3 - Evidence of internal audits 5.3.1.4 - Independent assessments 5.3.1.5 - Supply chain analysis • 5.3.2 - Vendor selection <ul style="list-style-type: none"> 5.3.2.1 - Due diligence 5.3.2.2 - Conflict of interest • 5.3.3 - Agreement types <ul style="list-style-type: none"> 5.3.3.1 - Service-level agreement (SLA) 5.3.3.2 - Memorandum of agreement (MOA) 5.3.3.3 - Memorandum of understanding (MOU) 5.3.3.4 - Master service agreement (MSA) 5.3.3.5 - Work order (WO)/statement of work (SOW) 5.3.3.6 - Non-disclosure agreement (NDA) 5.3.3.7 - Business partners agreement (BPA) • 5.3.4 - Vendor monitoring |

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| | | <ul style="list-style-type: none"> • 5.3.5 - Questionnaires • 5.3.6 - Rules of engagement |
| 12.3 | Audits and Assessments | <p>4.3 Explain various activities associated with vulnerability management</p> <ul style="list-style-type: none"> • 4.3.1 - Identification methods <ul style="list-style-type: none"> 4.3.1.6 - System/process audit • 4.3.4 - Validation of remediation <ul style="list-style-type: none"> 4.3.4.2 - Audit <p>4.4 Explain security alerting and monitoring concepts and tools</p> <ul style="list-style-type: none"> • 4.4.2 - Activities <ul style="list-style-type: none"> 4.4.2.1 - Log aggregation <p>4.5 Given a scenario, modify enterprise capabilities to enhance security</p> <ul style="list-style-type: none"> • 4.5.4 - Operating system security <ul style="list-style-type: none"> 4.5.4.1 - Group Policy <p>4.9 Given a scenario, use data sources to support an investigation</p> <ul style="list-style-type: none"> • 4.9.1 - Log data <ul style="list-style-type: none"> 4.9.1.4 - OS-specific security logs 4.9.1.6 - Network logs <p>5.1 Summarize elements of effective security governance</p> |

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| | | <ul style="list-style-type: none"> • 5.1.2 - Policies <ul style="list-style-type: none"> 5.1.2.2 - Information security policies <p>5.5 Explain types and purposes of audits and assessments</p> <ul style="list-style-type: none"> • 5.5.1 - Attestation • 5.5.2 - Internal <ul style="list-style-type: none"> 5.5.2.1 - Compliance 5.5.2.2 - Audit committee 5.5.2.3 - Self-assessments • 5.5.3 - External <ul style="list-style-type: none"> 5.5.3.1 - Regulatory 5.5.3.2 - Examinations 5.5.3.3 - Assessment 5.5.3.4 - Independent third-party audit |
| 13.0 | Data Protection and Compliance | |
| 13.1 | Data Classification and Compliance | <p>3.3 Compare and contrast concepts and strategies to protect data</p> <ul style="list-style-type: none"> • 3.3.1 - Data types <ul style="list-style-type: none"> 3.3.1.1 - Regulated 3.3.1.2 - Trade secret 3.3.1.3 - Intellectual property 3.3.1.4 - Legal information 3.3.1.5 - Financial information 3.3.1.6 - Human and non-human readable • 3.3.2 - Data classifications |

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| | | <ul style="list-style-type: none"> 3.3.2.1 - Sensitive 3.3.2.2 - Confidential 3.3.2.3 - Public 3.3.2.4 - Restricted 3.3.2.5 - Private 3.3.2.6 - Critical <ul style="list-style-type: none"> • 3.3.3 - General data considerations <ul style="list-style-type: none"> 3.3.3.2 - Data sovereignty <p>4.2 Explain the security implications of proper hardware, software, and data asset management</p> <ul style="list-style-type: none"> • 4.2.3 - Disposal/decommissioning <ul style="list-style-type: none"> 4.2.3.1 - Sanitization 4.2.3.2 - Destruction 4.2.3.3 - Certification 4.2.3.4 - Data retention <p>5.1 Summarize elements of effective security governance</p> <ul style="list-style-type: none"> • 5.1.8 - Roles and responsibilities for systems and data <ul style="list-style-type: none"> 5.1.8.2 - Controllers 5.1.8.3 - Processors <p>5.4 Summarize elements of effective security compliance</p> <ul style="list-style-type: none"> • 5.4.2 - Consequences of non-compliance <ul style="list-style-type: none"> 5.4.2.1 - Fines 5.4.2.2 - Sanctions 5.4.2.3 - Reputational damage |
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| | | <p>5.4.2.4 - Loss of license 5.4.2.5 - Contractual impacts</p> <ul style="list-style-type: none"> 5.4.4 - Privacy <ul style="list-style-type: none"> 5.4.4.1 - Legal implications <ul style="list-style-type: none"> 5.4.4.1.1 - Local/regional 5.4.4.1.2 - National 5.4.4.1.3 - Global 5.4.4.2 - Data subject 5.4.4.3 - Controller vs. processor 5.4.4.4 - Ownership 5.4.4.5 - Data inventory and retention 5.4.4.6 - Right to be forgotten |
| <p>13.2</p> | <p>Personnel Policies</p> | <p>2.5 Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> 2.5.8 - Least privilege <p>3.3 Compare and contrast concepts and strategies to protect data</p> <ul style="list-style-type: none"> 3.3.1 - Data types <ul style="list-style-type: none"> 3.3.1.1 - Regulated 3.3.1.3 - Intellectual property 3.3.1.4 - Legal information 3.3.1.5 - Financial information 3.3.2 - Data classifications 3.3.3 - General data considerations <ul style="list-style-type: none"> 3.3.3.1 - Data states <ul style="list-style-type: none"> 3.3.3.1.1 - Data at rest 3.3.3.1.2 - Data in transit 3.3.3.1.3 - Data in use 3.3.3.2 - Data sovereignty |

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| | | <p>3.3.3.3 - Geolocation</p> <ul style="list-style-type: none"> • 3.3.4 - Methods to secure data <p>3.3.4.2 - Encryption</p> <p>4.1 Given a scenario, apply common security techniques to computing resources</p> <ul style="list-style-type: none"> • 4.1.4 - Mobile solutions <p>4.1.4.2.1 - Bring your own device (BYOD)</p> <p>4.2 Explain the security implications of proper hardware, software, and data asset management</p> <ul style="list-style-type: none"> • 4.2.3 - Disposal/decommissioning <p>4.2.3.4 - Data retention</p> <p>4.4 Explain security alerting and monitoring concepts and tools</p> <ul style="list-style-type: none"> • 4.4.3 - Tools <p>4.4.3.3.3 - Data loss prevention (DLP)</p> <p>4.6 Given a scenario, implement and maintain identity and access management</p> <ul style="list-style-type: none"> • 4.6.8 - Access controls <p>4.6.8.7 - Least privilege</p> <p>4.8 Explain appropriate incident response activities</p> <ul style="list-style-type: none"> • 4.8.2 - Training |
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| | | <ul style="list-style-type: none"> • 4.8.6 - Digital forensics <ul style="list-style-type: none"> 4.8.6.1 - Legal hold 5.1 Summarize elements of effective security governance <ul style="list-style-type: none"> • 5.1.2 - Policies <ul style="list-style-type: none"> 5.1.2.1 - Acceptable use policy (AUP) • 5.1.4 - Procedures <ul style="list-style-type: none"> 5.1.4.2 - Onboarding/offboarding 5.3 Explain the processes associated with third-party risk assessment and management <ul style="list-style-type: none"> • 5.3.2 - Vendor selection <ul style="list-style-type: none"> 5.3.2.1 - Due diligence 5.4 Summarize elements of effective security compliance <ul style="list-style-type: none"> • 5.4.4 - Privacy <ul style="list-style-type: none"> 5.4.4.1 - Legal implications 5.4.4.5 - Data inventory and retention 5.6 Given a scenario, implement security awareness practices <ul style="list-style-type: none"> • 5.6.1 - Phishing <ul style="list-style-type: none"> 5.6.1.2 - Recognizing a phishing attempt • 5.6.2 - Anomalous behavior recognition |
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| | | <p>5.6.2.1 - Risky 5.6.2.2 - Unexpected 5.6.2.3 - Unintentional</p> <ul style="list-style-type: none"> • 5.6.3 - User guidance and training <ul style="list-style-type: none"> 5.6.3.1 - Policy/handbooks 5.6.3.2 - Situational awareness 5.6.3.5 - Removable media and cables 5.6.3.6 - Social engineering • 5.6.4 - Reporting and monitoring <ul style="list-style-type: none"> 5.6.4.1 - Initial 5.6.4.2 - Recurring • 5.6.5 - Development |
| A.0 | CompTIA Security+ SY0-701 - Practice Exams | |
| A.1 | Prepare for CompTIA Security+ SY0-701 Certification | |
| A.2 | CompTIA Security+ Domain Review (20 Questions) | |
| A.3 | CompTIA Security+ Domain Review (All Questions) | |
| B.0 | TestOut Security Pro - Practice Exams | |

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| B.1 | Prepare for TestOut Security Pro Certification | |
| B.2 | TestOut Security Pro Domain Review | |

Objective Mapping: CompTIA SY0-701 Objective to LabSim Section

| # | Domain | Module.Section |
|------------|--|---|
| 1.0 | General Security Concepts | |
| 1.1 | <p>Compare and contrast various types of security controls</p> <p>1.1.1 - Categories</p> <ul style="list-style-type: none"> ○ 1.1.1.1 - Technical ○ 1.1.1.2 - Managerial ○ 1.1.1.3 - Operational ○ 1.1.1.4 - Physical <p>1.1.2 - Control types</p> <ul style="list-style-type: none"> ○ 1.1.2.1 - Preventive ○ 1.1.2.2 - Deterrent ○ 1.1.2.3 - Detective ○ 1.1.2.4 - Corrective ○ 1.1.2.5 - Compensating ○ 1.1.2.6 - Directive | <p>1.1, 1.2 5.10</p> <p>7.1</p> |
| 1.2 | <p>Summarize fundamental security concepts</p> <p>1.2.1 - Confidentiality, Integrity, and Availability (CIA)</p> <p>1.2.2 - Non-repudiation</p> <p>1.2.3 - Authentication, Authorization, and Accounting (AAA)</p> <ul style="list-style-type: none"> ○ 1.2.3.1 - Authenticating people ○ 1.2.3.2 - Authenticating systems ○ 1.2.3.3 - Authorization models <p>1.2.4 - Gap analysis</p> <p>1.2.5 - Zero trust</p> <ul style="list-style-type: none"> ○ 1.2.5.1 - Control plane ○ 1.2.5.1.1 - Adaptive identity ○ 1.2.5.1.2 - Threat scope reduction ○ 1.2.5.1.3 - Policy-driven access control ○ 1.2.5.1.4 - Policy Administrator ○ 1.2.5.1.5 - Policy Engine | <p>1.1 4.1, 4.2, 4.3, 4.4, 4.5</p> <p>5.2</p> <p>6.1</p> <p>8.2</p> <p>10.4</p> |

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| | <ul style="list-style-type: none"> ○ 1.2.5.2 - Data plane ○ 1.2.5.2.1 - Implicit trust zones ○ 1.2.5.2.2 - Subject/System ○ 1.2.5.2.3 - Policy enforcement point 1.2.6 - Physical security <ul style="list-style-type: none"> ○ 1.2.6.1 - Bollards ○ 1.2.6.2 - Access control vestibule ○ 1.2.6.3 - Fencing ○ 1.2.6.4 - Video surveillance ○ 1.2.6.5 - Security guard ○ 1.2.6.6 - Access badge ○ 1.2.6.7 - Lighting ○ 1.2.6.8 - Sensors ○ 1.2.6.8.1 - Infrared ○ 1.2.6.8.2 - Pressure ○ 1.2.6.8.3 - Microwave ○ 1.2.6.8.4 - Ultrasonic 1.2.7 - Deception and disruption technology <ul style="list-style-type: none"> ○ 1.2.7.1 - Honeypot ○ 1.2.7.2 - Honeynet ○ 1.2.7.3 - Honeyfile ○ 1.2.7.4 - Honeytoken | |
| <p>1.3</p> | <p>Explain the importance of change management processes and the impact to security</p> <ul style="list-style-type: none"> 1.3.1 - Business processes impacting security operation <ul style="list-style-type: none"> ○ 1.3.1.1 - Approval process ○ 1.3.1.2 - Ownership ○ 1.3.1.3 - Stakeholders ○ 1.3.1.4 - Impact analysis ○ 1.3.1.5 - Test results ○ 1.3.1.6 - Backout plan ○ 1.3.1.7 - Maintenance window ○ 1.3.1.8 - Standard operating procedure 1.3.2 - Technical implications <ul style="list-style-type: none"> ○ 1.3.2.1 - Allow lists/deny lists ○ 1.3.2.2 - Restricted activities ○ 1.3.2.3 - Downtime | <p>8.9 11.2</p> |

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| | <ul style="list-style-type: none"> ○ 1.3.2.4 - Service restart ○ 1.3.2.5 - Application restart ○ 1.3.2.6 - Legacy applications ○ 1.3.2.7 - Dependencies <p>1.3.3 - Documentation</p> <ul style="list-style-type: none"> ○ 1.3.3.1 - Updating diagrams ○ 1.3.3.2 - Updating policies/procedures <p>1.3.4 -Version control</p> | |
| 1.4 | <p>Explain the importance of using appropriate cryptographic solutions</p> <p>1.4.1 - Public key infrastructure (PKI)</p> <ul style="list-style-type: none"> ○ 1.4.1.1 - Public key ○ 1.4.1.2 - Private key ○ 1.4.1.3 - Key escrow <p>1.4.2 - Encryption</p> <ul style="list-style-type: none"> ○ 1.4.2.1 - Level ○ 1.4.2.1.1 - Full-disk ○ 1.4.2.1.2 - Partition ○ 1.4.2.1.3 - File ○ 1.4.2.1.4 - Volume ○ 1.4.2.1.5 - Database ○ 1.4.2.1.6 - Record ○ 1.4.2.2 - Transport/communication ○ 1.4.2.3 - Asymmetric ○ 1.4.2.4 - Symmetric ○ 1.4.2.5 - Key exchange ○ 1.4.2.6 - Algorithms ○ 1.4.2.7 - Key length <p>1.4.3 - Tools</p> <ul style="list-style-type: none"> ○ 1.4.3.1 - Trusted Platform Module (TPM) ○ 1.4.3.2 - Hardware security module (HSM) ○ 1.4.3.3 - Key management system ○ 1.4.3.4 - Secure enclave <p>1.4.4 - Obfuscation</p> <ul style="list-style-type: none"> ○ 1.4.4.1 - Steganography ○ 1.4.4.2 - Tokenization ○ 1.4.4.3 - Data masking | <p>3.1, 3.2, 3.3, 3.4, 3.5 4.3 5.8 6.6 7.3 8.1, 8.2, 8.7 10.8</p> |

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| | <ul style="list-style-type: none"> 1.4.5 - Hashing 1.4.6 - Salting 1.4.7 - Digital signatures 1.4.8 - Key stretching 1.4.9 - Blockchain 1.4.10 - Open public ledger 1.4.11 - Certificates <ul style="list-style-type: none"> ○ 1.4.11.1 - Certificate authorities ○ 1.4.11.2 - Certificate revocation lists (CRLs) ○ 1.4.11.3 - Online Certificate Status Protocol (OCSP) ○ 1.4.11.4 - Self-signed ○ 1.4.11.5 - Third-party ○ 1.4.11.6 - Root of trust ○ 1.4.11.7 - Certificate signing request (CSR) generation ○ 1.4.11.8 - Wildcard | |
| 2.0 | Threats, Vulnerabilities, and Mitigations | |
| 2.1 | <p>Compare and contrast common threat actors and motivations</p> <ul style="list-style-type: none"> 2.1.1 - Threat actors <ul style="list-style-type: none"> ○ 2.1.1.1 - Nation-state ○ 2.1.1.2 - Unskilled attacker ○ 2.1.1.3 - Hactivist ○ 2.1.1.4 - Insider threat ○ 2.1.1.5 - Organized crime ○ 2.1.1.6 - Shadow IT 2.1.2 - Attributes of actors <ul style="list-style-type: none"> ○ 2.1.2.1 - Internal/external ○ 2.1.2.2 - Resources/funding ○ 2.1.2.3 - Level of sophistication/capability 2.1.3 - Motivations <ul style="list-style-type: none"> ○ 2.1.3.1 - Data exfiltration ○ 2.1.3.2 - Espionage ○ 2.1.3.3 - Service disruption ○ 2.1.3.4 - Blackmail ○ 2.1.3.5 - Financial gain | <p>1.1 2.1, 2.2 6.5</p> |

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| | <ul style="list-style-type: none"> ○ 2.1.3.6 - Philosophical/political beliefs ○ 2.1.3.7- Ethical ○ 2.1.3.8 - Revenge ○ 2.1.3.9 - Disruption/chaos ○ 2.1.3.10 - War | |
| 2.2 | <p>Explain common threat vectors and attack surfaces</p> <ul style="list-style-type: none"> 2.2.1 - Message-based <ul style="list-style-type: none"> ○ 2.2.1.1 - Email ○ 2.2.1.2 - Short Message Service (SMS) ○ 2.2.1.3 - Instant messaging (IM) 2.2.2 - Image-based 2.2.3 - File-based 2.2.4 - Voice call 2.2.5 - Removable device 2.2.6 - Vulnerable software <ul style="list-style-type: none"> ○ 2.2.6.1 - Client-based vs. agentless 2.2.7 - Unsupported systems and applications 2.2.8 - Unsecure networks <ul style="list-style-type: none"> ○ 2.2.8.1 - Wireless ○ 2.2.8.2 - Wired ○ 2.2.8.3 - Bluetooth 2.2.9 - Open service ports 2.2.10 - Default credentials 2.2.11 - Supply chain <ul style="list-style-type: none"> ○ 2.2.11.1 - Managed service providers (MSPs) ○ 2.2.11.2 - Vendors ○ 2.2.11.3 - Suppliers 2.2.12 - Human vectors/social engineering <ul style="list-style-type: none"> ○ 2.2.12.1 - Phishing ○ 2.2.12.2 - Vishing ○ 2.2.12.3 - Smishing ○ 2.2.12.4 - Misinformation/disinformation ○ 2.2.12.5 - Impersonation ○ 2.2.12.6 - Business email compromise ○ 2.2.12.7 - Pretexting ○ 2.2.12.8 - Watering hole | <p>2.1, 2.2 5.10</p> <p>6.2, 6.6</p> <p>7.2, 7.4</p> <p>8.1, 8.2, 8.3, 8.5, 8.6, 8.9</p> <p>10.4, 10.7, 10.8</p> |

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| | <ul style="list-style-type: none"> ○ 2.2.12.9 - Brand impersonation ○ 2.2.12.10 - Typosquatting | |
| 2.3 | <p>Explain various types of vulnerabilities</p> <ul style="list-style-type: none"> 2.3.1 - Application <ul style="list-style-type: none"> ○ 2.3.1.1 - Memory injection ○ 2.3.1.2 - Buffer overflow ○ 2.3.1.3 - Race conditions <ul style="list-style-type: none"> ○ 2.3.1.3.1 - Time-of-check (TOC) ○ 2.3.1.3.2 - Time-of-use (TOU) ○ 2.3.1.4 - Malicious update 2.3.2 - Operating system (OS)-based 2.3.3 - Web-based <ul style="list-style-type: none"> ○ 2.3.3.1 - Structured Query Language injection (SQLi) ○ 2.3.3.2 - Cross-site scripting (XSS) 2.3.4 - Hardware <ul style="list-style-type: none"> ○ 2.3.4.1 - Firmware ○ 2.3.4.2 - End-of-life ○ 2.3.4.3 - Legacy 2.3.5 - Virtualization <ul style="list-style-type: none"> ○ 2.3.5.1 - Virtual machine (VM) escape ○ 2.3.5.2 - Resource reuse 2.3.6 - Cloud-specific 2.3.7 - Supply chain <ul style="list-style-type: none"> ○ 2.3.7.1 - Service provider ○ 2.3.7.2 - Hardware provider ○ 2.3.7.3 - Software provider 2.3.8 - Cryptographic 2.3.9 - Misconfiguration 2.3.10 - Mobile device <ul style="list-style-type: none"> ○ 2.3.10.1 - Side loading ○ 2.3.10.2 - Jailbreaking 2.3.11 - Zero-day | <p>2.1 5.7, 5.10</p> <p>7.1</p> <p>8.6, 8.8</p> <p>10.1, 10.4, 10.5</p> |
| 2.4 | Given a scenario, analyze indicators of malicious activity | 2.1, 2.3 |

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| 2.4.1 - Malware attacks | 3.1 |
| ○ 2.4.1.1 - Ransomware | 4.5 |
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| ○ 2.4.1.5 - Bloatware | 10.9 |
| ○ 2.4.1.6 - Virus | |
| ○ 2.4.1.7 - Keylogger | |
| ○ 2.4.1.8 - Logic bomb | |
| ○ 2.4.1.9 - Rootkit | |
| 2.4.2 - Physical attacks | |
| ○ 2.4.2.1 - Brute force | |
| ○ 2.4.2.2 - Radio frequency identification (RFID) cloning | |
| ○ 2.4.2.3 - Environmental | |
| 2.4.3 - Network attacks | |
| ○ 2.4.3.1 - Distributed denial-of-service (DDoS) | |
| ○ 2.4.3.1.1 - Amplified | |
| ○ 2.4.3.1.2 - Reflected | |
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| ○ 2.4.3.3 - Wireless | |
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| ○ 2.4.3.5 - Credential replay | |
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| 2.4.4 - Application attacks | |
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| 2.4.7 - Indicators | |
| ○ 2.4.7.1 - Account lockout | |

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| | <ul style="list-style-type: none"> ○ 2.4.7.2 - Concurrent session usage ○ 2.4.7.3 - Blocked content ○ 2.4.7.4 - Impossible travel ○ 2.4.7.5 - Resource consumption ○ 2.4.7.6 - Resource inaccessibility ○ 2.4.7.7 - Out-of-cycle logging ○ 2.4.7.8 - Published/documented ○ 2.4.7.9 - Missing logs | |
| 2.5 | <p>Explain the purpose of mitigation techniques used to secure the enterprise</p> <ul style="list-style-type: none"> 2.5.1 - Segmentation 2.5.2 - Access control <ul style="list-style-type: none"> ○ 2.5.2.1 - Access control list (ACL) ○ 2.5.2.2 - Permissions 2.5.3 - Application allow list 2.5.4 - Isolation 2.5.5 - Patching 2.5.6 - Encryption 2.5.7 - Monitoring 2.5.8 - Least privilege 2.5.9 - Configuration enforcement 2.5.10 - Decommissioning 2.5.11 - Hardening techniques <ul style="list-style-type: none"> ○ 2.5.11.1 - Encryption ○ 2.5.11.2 - Installation of endpoint protection ○ 2.5.11.3 - Host-based firewall ○ 2.5.11.4 - Host-based intrusion prevention system (HIPS) ○ 2.5.11.5 - Disabling ports/protocols ○ 2.5.11.6 - Default password changes ○ 2.5.11.7 - Removal of unnecessary software | <p>2.1 3.4 4.1, 4.3, 4.6 5.4, 5.7, 5.10 6.2, 6.3, 6.4 7.3 8.1, 8.2, 8.3, 8.6, 8.8, 8.9 9.1, 9.2 10.1, 10.5, 10.6, 10.7 13.2</p> |
| 3.0 | Security Architecture | |
| 3.1 | Compare and contrast security implications of different architecture models | <p>5.1 9.4</p> |

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| | <ul style="list-style-type: none"> 3.1.1 - Architecture and infrastructure concepts <ul style="list-style-type: none"> ○ 3.1.1.1 - Cloud <ul style="list-style-type: none"> ○ 3.1.1.1.1 - Responsibility matrix ○ 3.1.1.1.2 - Hybrid considerations ○ 3.1.1.1.3 - Third-party vendors ○ 3.1.1.2 - Infrastructure as code (IaC) ○ 3.1.1.3 - Serverless ○ 3.1.1.4 - Microservices ○ 3.1.1.5 - Network infrastructure <ul style="list-style-type: none"> ○ 3.1.1.5.1 - Physical isolation <ul style="list-style-type: none"> ○ 3.1.1.5.1.1 - Air-gapped ○ 3.1.1.5.2 - Logical segmentation ○ 3.1.1.5.3 - Software-defined networking (SDN) ○ 3.1.1.6 - On-premises ○ 3.1.1.7 - Centralized/decentralized ○ 3.1.1.8 - Containerization ○ 3.1.1.9 - Virtualization ○ 3.1.1.10 - IoT ○ 3.1.1.11 - Industrial control systems (ICS)/supervisory control and data acquisition (SCADA) ○ 3.1.1.12 - Real-time operating system (RTOS) ○ 3.1.1.13 - Embedded systems ○ 3.1.1.14 - High availability 3.1.2 - Considerations <ul style="list-style-type: none"> ○ 3.1.2.1 - Availability ○ 3.1.2.2 - Resilience ○ 3.1.2.3 - Cost ○ 3.1.2.4 - Responsiveness ○ 3.1.2.5 - Scalability ○ 3.1.2.6 - Ease of deployment ○ 3.1.2.7 - Risk transference ○ 3.1.2.8 - Ease of recovery ○ 3.1.2.9 - Patch availability ○ 3.1.2.10 - Inability to patch ○ 3.1.2.11 - Power ○ 3.1.2.12 - Compute | 10.1, 10.2, 10.3, 10.4, 10.6, 10.8 |
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| 3.2 | <p>Given a scenario, apply security principles to secure enterprise infrastructure</p> <p>3.2.1 - Infrastructure considerations</p> <ul style="list-style-type: none"> ○ 3.2.1.1 - Device placement ○ 3.2.1.2 - Security zones ○ 3.2.1.3 - Attack surface ○ 3.2.1.4 - Connectivity ○ 3.2.1.5 - Failure modes ○ 3.2.1.5.1 - Fail-open ○ 3.2.1.5.2 - Fail-closed ○ 3.2.1.6 - Device attribute ○ 3.2.1.6.1 - Active vs. passive ○ 3.2.1.6.2 - Inline vs. tap/monitor ○ 3.2.1.7 - Network appliances ○ 3.2.1.7.1 - Jump server ○ 3.2.1.7.2 - Proxy server ○ 3.2.1.7.3 - Intrusion prevention system (IPS)/intrusion detection system (IDS) ○ 3.2.1.7.4 - Load balancer ○ 3.2.1.7.5 - Sensors ○ 3.2.1.8 - Port security ○ 3.2.1.8.1 - 802.1X ○ 3.2.1.8.2 - Extensible Authentication Protocol (EAP) ○ 3.2.1.9 - Firewall types ○ 3.2.1.9.1 - Web application firewall (WAF) ○ 3.2.1.9.2 - Unified threat management (UTM) ○ 3.2.1.9.3 - Next-generation firewall (NGFW) ○ 3.2.1.9.4 - Layer 4/Layer 7 <p>3.2.2 - Secure communication/access</p> <ul style="list-style-type: none"> ○ 3.2.2.1 - Virtual private network (VPN) ○ 3.2.2.2 - Remote access ○ 3.2.2.3 - Tunneling ○ 3.2.2.3.1 - Transport Layer Security (TLS) ○ 3.2.2.3.2 - Internet protocol security (IPSec) ○ 3.2.2.4 - Software-defined wide area network (SD-WAN) ○ 3.2.2.5 - Secure access service edge (SASE) <p>3.2.3 - Selection of effective controls</p> | <p>2.1</p> <p>4.8</p> <p>5.1, 5.2, 5.3, 5.4, 5.5, 5.9, 5.10</p> <p>6.3</p> <p>7.3</p> <p>8.2, 8.6, 8.7, 8.8</p> <p>9.2, 9.4</p> <p>10.1, 10.2, 10.9</p> |
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| 3.3 | <p>Compare and contrast concepts and strategies to protect data</p> <ul style="list-style-type: none"> 3.3.1 - Data types <ul style="list-style-type: none"> ○ 3.3.1.1 - Regulated ○ 3.3.1.2 - Trade secret ○ 3.3.1.3 - Intellectual property ○ 3.3.1.4 - Legal information ○ 3.3.1.5 - Financial information ○ 3.3.1.6 - Human and non-human readable 3.3.2 - Data classifications <ul style="list-style-type: none"> ○ 3.3.2.1 - Sensitive ○ 3.3.2.2 - Confidential ○ 3.3.2.3 - Public ○ 3.3.2.4 - Restricted ○ 3.3.2.5 - Private ○ 3.3.2.6 - Critical 3.3.3 - General data considerations <ul style="list-style-type: none"> ○ 3.3.3.1 - Data states <ul style="list-style-type: none"> ○ 3.3.3.1.1 - Data at rest ○ 3.3.3.1.2 - Data in transit ○ 3.3.3.1.3 - Data in use ○ 3.3.3.2 - Data sovereignty ○ 3.3.3.3 - Geolocation 3.3.4 - Methods to secure data <ul style="list-style-type: none"> ○ 3.3.4.1 - Geographic restrictions ○ 3.3.4.2 - Encryption ○ 3.3.4.3 - Hashing ○ 3.3.4.4 - Masking ○ 3.3.4.5 - Tokenization ○ 3.3.4.6 - Obfuscation ○ 3.3.4.7 - Segmentation ○ 3.3.4.8 - Permission restrictions | <p>5.9, 5.10 7.3 8.9 10.5, 10.8 13.1, 13.2</p> |
| 3.4 | <p>Explain the importance of resilience and recovery in security architecture</p> <ul style="list-style-type: none"> 3.4.1 - High availability <ul style="list-style-type: none"> ○ 3.4.1.1 - Load balancing vs. clustering 3.4.2 - Site considerations | <p>6.1 9.4, 9.5 10.1, 10.4</p> |

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| | <ul style="list-style-type: none"> ○ 3.4.2.1 - Hot ○ 3.4.2.2 - Cold ○ 3.4.2.3 - Warm ○ 3.4.2.4 - Geographic dispersion <p>3.4.3 - Platform diversity</p> <p>3.4.4 - Multi-cloud systems</p> <p>3.4.5 - Continuity of operations</p> <p>3.4.6 - Capacity planning</p> <ul style="list-style-type: none"> ○ 3.4.6.1 - People ○ 3.4.6.2 - Technology ○ 3.4.6.3 - Infrastructure <p>3.4.7 - Testing</p> <ul style="list-style-type: none"> ○ 3.4.7.1 - Tabletop exercises ○ 3.4.7.2 - Fail over ○ 3.4.7.3 - Simulation ○ 3.4.7.4 - Parallel processing <p>3.4.8 - Backups</p> <ul style="list-style-type: none"> ○ 3.4.8.1 - Onsite/offsite ○ 3.4.8.2 - Frequency ○ 3.4.8.3 - Encryption ○ 3.4.8.4 - Snapshots ○ 3.4.8.5 - Recovery ○ 3.4.8.6 - Replication ○ 3.4.8.7 - Journaling <p>3.4.9 - Power</p> <ul style="list-style-type: none"> ○ 3.4.9.1 - Generators ○ 3.4.9.2 - Uninterruptible power supply (UPS) | 12.1 |
| 4.0 | Security Operations | |
| 4.1 | <p>Given a scenario, apply common security techniques to computing resources</p> <p>4.1.1 - Secure baselines</p> <ul style="list-style-type: none"> ○ 4.1.1.1 - Establish ○ 4.1.1.2 - Deploy ○ 4.1.1.3 - Maintain <p>4.1.2 - Hardening targets</p> | <p>3.5</p> <p>4.6, 4.8</p> <p>5.9, 5.10</p> <p>6.2, 6.4</p> <p>7.3</p> |

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| | <ul style="list-style-type: none"> ○ 4.1.2.1 - Mobile devices ○ 4.1.2.2 - Workstations ○ 4.1.2.3 - Switches ○ 4.1.2.4 - Routers ○ 4.1.2.5 - Cloud infrastructure ○ 4.1.2.6 - Servers ○ 4.1.2.7 - ICS/SCADA ○ 4.1.2.8 - Embedded systems ○ 4.1.2.9 - RTOS ○ 4.1.2.10 - IoT devices 4.1.3. Wireless devices <ul style="list-style-type: none"> ○ 4.1.3.1 - Installation considerations <ul style="list-style-type: none"> ○ 4.1.3.1.1 - Site surveys ○ 4.1.3.1.2 - Heat maps 4.1.4 - Mobile solutions <ul style="list-style-type: none"> ○ 4.1.4.1 - Mobile device management (MDM) ○ 4.1.4.2 - Deployment models <ul style="list-style-type: none"> ○ 4.1.4.2.1 - Bring your own device (BYOD) ○ 4.1.4.2.2 - Corporate-owned, personally enabled (COPE) ○ 4.1.4.2.3 - Choose your own device (CYOD) ○ 4.1.4.3 - Connections methods <ul style="list-style-type: none"> ○ 4.1.4.3.1 - Cellular ○ 4.1.4.3.2 - Wi-Fi ○ 4.1.4.3.3 - Bluetooth 4.1.5 - Wireless security settings <ul style="list-style-type: none"> ○ 4.1.5.1 - Wi-Fi Protected Access 3 (WPA3) ○ 4.1.5.2 - AAA/Remote Authentication Dial-In User Service (RADIUS) ○ 4.1.5.3 - Cryptographic protocols ○ 4.1.5.4 - Authentication protocols 4.1.6 - Application security <ul style="list-style-type: none"> ○ 4.1.6.1 - Input validation ○ 4.1.6.2 - Secure cookies ○ 4.1.6.3 - Static code analysis ○ 4.1.6.4 - Code signing 4.1.7. Sandboxing 4.1.8. Monitoring | <p>8.1, 8.2, 8.4, 8.5, 8.6, 8.8, 8.9</p> <p>9.2</p> <p>10.1, 10.2, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9</p> <p>13.2</p> |
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| 4.2 | <p>Explain the security implications of proper hardware, software, and data asset management</p> <ul style="list-style-type: none"> 4.2.1 - Acquisition/procurement process 4.2.2 - Assignment/accounting <ul style="list-style-type: none"> ○ 4.2.2.1 - Ownership ○ 4.2.2.2 - Classification 4.2.3 - Disposal/decommissioning <ul style="list-style-type: none"> ○ 4.2.3.1 - Sanitization ○ 4.2.3.2 - Destruction ○ 4.2.3.3 - Certification ○ 4.2.3.4 - Data retention | <p>8.2 10.6 12.1 13.1, 13.2</p> |
| 4.3 | <p>Explain various activities associated with vulnerability management</p> <ul style="list-style-type: none"> 4.3.1 - Identification methods <ul style="list-style-type: none"> ○ 4.3.1.1 - Vulnerability scan ○ 4.3.1.2 - Application security <ul style="list-style-type: none"> ○ 4.3.1.2.1 - Static analysis ○ 4.3.1.2.2 - Dynamic analysis ○ 4.3.1.2.3 - Package monitoring ○ 4.3.1.3 - Threat feed <ul style="list-style-type: none"> ○ 4.3.1.3.1 - Open-source intelligence (OSINT) ○ 4.3.1.3.2 - Proprietary/third-party ○ 4.3.1.3.3 - Information-sharing organization ○ 4.3.1.3.4 - Dark web ○ 4.3.1.4 - Penetration testing ○ 4.3.1.5 - Responsible disclosure program <ul style="list-style-type: none"> ○ 4.3.1.5.1 - Bug bounty program ○ 4.3.1.6 - System/process audit 4.3.2 - Analysis <ul style="list-style-type: none"> ○ 4.3.2.1 - Confirmation <ul style="list-style-type: none"> ○ 4.3.2.1.1 - False positive ○ 4.3.2.1.2 - False negative ○ 4.3.2.2 - Prioritize ○ 4.3.2.3 - Common Vulnerability Scoring System (CVSS) ○ 4.3.2.4 - Common Vulnerability Enumeration (CVE) ○ 4.3.2.5 - Vulnerability classification ○ 4.3.2.6 - Exposure factor | <p>5.8 6.2, 6.3 7.1, 7.2, 7.3, 7.4 8.1, 8.2, 8.9 9.2 10.1 12.3</p> |

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| | <ul style="list-style-type: none"> ○ 4.3.2.7 - Environmental variables ○ 4.3.2.8 - Industry/organizational impact ○ 4.3.2.9 - Risk tolerance 4.3.3 - Vulnerability response and remediation <ul style="list-style-type: none"> ○ 4.3.3.1 - Patching ○ 4.3.3.2 - Insurance ○ 4.3.3.3 - Segmentation ○ 4.3.3.4 - Compensating controls ○ 4.3.3.5 - Exceptions and exemptions 4.3.4 - Validation of remediation <ul style="list-style-type: none"> ○ 4.3.4.1 - Rescanning ○ 4.3.4.2 - Audit ○ 4.3.4.3 - Verification 4.3.5 - Reporting | |
| <p>4.4</p> | <p>Explain security alerting and monitoring concepts and tools</p> <ul style="list-style-type: none"> 4.4.1 - Monitoring computing resources <ul style="list-style-type: none"> ○ 4.4.1.1 - Systems ○ 4.4.1.2 - Applications ○ 4.4.1.3 - Infrastructure 4.4.2 - Activities <ul style="list-style-type: none"> ○ 4.4.2.1 - Log aggregation ○ 4.4.2.2 - Alerting ○ 4.4.2.3 - Scanning ○ 4.4.2.4 - Reporting ○ 4.4.2.5 - Archiving ○ 4.4.2.6 - Alert response and remediation/validation <ul style="list-style-type: none"> ○ 4.4.2.6.1 - Quarantine ○ 4.4.2.6.2 - Alert tuning 4.4.3 - Tools <ul style="list-style-type: none"> ○ 4.4.3.1 - Security Content Automation Protocol (SCAP) ○ 4.4.3.2 - Benchmarks ○ 4.4.3.3 - Agents/agentless <ul style="list-style-type: none"> ○ 4.4.3.3.1 - Security information and event management (SIEM) ○ 4.4.3.3.2 - Antivirus ○ 4.4.3.3.3 - Data loss prevention (DLP) ○ 4.4.3.4 - Simple Network Management Protocol (SNMP) traps | <p>6.2 7.1, 7.2, 7.3, 7.4</p> <p>9.2</p> <p>12.3</p> <p>13.2</p> |

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| | <ul style="list-style-type: none"> ○ 4.4.3.5 - NetFlow ○ 4.4.3.6 - Vulnerability scanners | |
| 4.5 | <p>Given a scenario, modify enterprise capabilities to enhance security</p> <ul style="list-style-type: none"> 4.5.1 - Firewall <ul style="list-style-type: none"> ○ 4.5.1.1 - Rules ○ 4.5.1.2 - Access lists ○ 4.5.1.3 - Ports/protocols ○ 4.5.1.4 - Screened subnets 4.5.2 - IDS/IPS <ul style="list-style-type: none"> ○ 4.5.2.1 - Trends ○ 4.5.2.2 - Signatures 4.5.3 - Web filter <ul style="list-style-type: none"> ○ 4.5.3.1 - Agent-based ○ 4.5.3.2 - Centralized proxy ○ 4.5.3.3 - Universal Resource Locator (URL) scanning ○ 4.5.3.4 - Content categorization ○ 4.5.3.5 - Block rules ○ 4.5.3.6 - Reputation 4.5.4 - Operating system security <ul style="list-style-type: none"> ○ 4.5.4.1 - Group Policy ○ 4.5.4.2 - SELinux 4.5.5 - Implementation of secure protocols <ul style="list-style-type: none"> ○ 4.5.5.1 - Protocol selection ○ 4.5.5.2 - Port selection ○ 4.5.5.3 - Transport method 4.5.6 - DNS filtering 4.5.7 - Email security <ul style="list-style-type: none"> ○ 4.5.7.1 - Domain-based Message Authentication Reporting and Conformance (DMARC) ○ 4.5.7.2 - DomainKeys Identified Mail (DKIM) ○ 4.5.7.3 - Sender Policy Framework (SPF) ○ 4.5.7.4 - Gateway 4.5.8. File integrity monitoring 4.5.9. DLP 4.5.10. Network access control (NAC) | <p>4.4, 4.5, 4.6 5.2, 5.3, 5.4, 5.6, 5.9, 5.10</p> <p>6.2, 6.3, 6.4</p> <p>8.1, 8.2, 8.9</p> <p>10.5, 10.7, 10.9</p> <p>12.3</p> |

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| | <p>4.5.11. Endpoint detection and response (EDR)/extended detection and response (XDR)</p> <p>4.5.12. User behavior analytics</p> | |
| 4.6 | <p>Given a scenario, implement and maintain identity and access management</p> <p>4.6.1 - Provisioning/de-provisioning user accounts</p> <p>4.6.2 - Permission assignments and implications</p> <p>4.6.3 - Identity proofing</p> <p>4.6.4 - Federation</p> <p>4.6.5 - Single sign-on (SSO)</p> <ul style="list-style-type: none"> ○ 4.6.5.1 - Lightweight Directory Access Protocol (LDAP) ○ 4.6.5.2 - Open authorization (OAuth) ○ 4.6.5.3 - Security Assertions Markup Language (SAML) <p>4.6.6 - Interoperability</p> <p>4.6.7 - Attestation</p> <p>4.6.8 - Access controls</p> <ul style="list-style-type: none"> ○ 4.6.8.1 - Mandatory ○ 4.6.8.2 - Discretionary ○ 4.6.8.3 - Role-based ○ 4.6.8.4 - Rule-based ○ 4.6.8.5 - Attribute-based ○ 4.6.8.6 - Time-of-day restrictions ○ 4.6.8.7 - Least privilege <p>4.6.9 - Multifactor authentication</p> <ul style="list-style-type: none"> ○ 4.6.9.1 - Implementations ○ 4.6.9.1.1 - Biometrics ○ 4.6.9.1.2 - Hard/soft authentication tokens ○ 4.6.9.1.3 - Security keys ○ 4.6.9.2 - Factors ○ 4.6.9.2.1 - Something you know ○ 4.6.9.2.2 - Something you have ○ 4.6.9.2.3 - Something you are ○ 4.6.9.2.4 - Somewhere you are <p>4.6.10 - Password concepts</p> <ul style="list-style-type: none"> ○ 4.6.10.1 - Password best practices ○ 4.6.10.1.1 - Length ○ 4.6.10.1.2 - Complexity | <p>4.1, 4.2, 4.3, 4.5, 4.6, 4.7, 4.9 5.7</p> <p>6.1</p> <p>8.1, 8.2, 8.8, 8.9</p> <p>10.5, 10.7</p> <p>11.1</p> <p>13.2</p> |

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| | <ul style="list-style-type: none"> ○ 4.6.10.1.3 - Reuse ○ 4.6.10.1.4 - Expiration ○ 4.6.10.1.5 - Age ○ 4.6.10.2 - Password managers ○ 4.6.10.3 - Passwordless 4.6.11 - Privileged access management tools <ul style="list-style-type: none"> ○ 4.6.11.1 - Just-in-time permissions ○ 4.6.11.2 - Password vaulting ○ 4.6.11.3 - Temporal accounts | |
| 4.7 | <p>Explain the importance of automation and orchestration related to secure operations</p> <ul style="list-style-type: none"> 4.7.1 - Use cases of automation and scripting <ul style="list-style-type: none"> ○ 4.7.1.1 - User provisioning ○ 4.7.1.2 - Resource provisioning ○ 4.7.1.3 - Guard rails ○ 4.7.1.4 - Security groups ○ 4.7.1.5 - Ticket creation ○ 4.7.1.6 - Escalation ○ 4.7.1.7 - Enabling/disabling services and access ○ 4.7.1.8 - Continuous integration and testing ○ 4.7.1.9 - Integrations and Application programming interfaces (APIs) 4.7.2 - Benefits <ul style="list-style-type: none"> ○ 4.7.2.1 - Efficiency/time saving ○ 4.7.2.2 - Enforcing baselines ○ 4.7.2.3 - Standard infrastructure configurations ○ 4.7.2.4 - Scaling in a secure manner ○ 4.7.2.5 - Staff retention ○ 4.7.2.6 - Reaction time ○ 4.7.2.7 - Workforce multiplier 4.7.3 - Other considerations <ul style="list-style-type: none"> ○ 4.7.3.1 - Complexity ○ 4.7.3.2 - Cost ○ 4.7.3.3 - Single point of failure ○ 4.7.3.4 - Technical debt ○ 4.7.3.5 - Ongoing supportability | <p>6.5 8.1, 8.9 11.3</p> |

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| 4.8 | <p>Explain appropriate incident response activities</p> <ul style="list-style-type: none"> 4.8.1 - Process <ul style="list-style-type: none"> ○ 4.8.1.1 - Preparation ○ 4.8.1.2 - Detection ○ 4.8.1.3 - Analysis ○ 4.8.1.4 - Containment ○ 4.8.1.5 - Eradication ○ 4.8.1.6 - Recovery ○ 4.8.1.7 - Lessons learned 4.8.2 - Training 4.8.3 - Testing <ul style="list-style-type: none"> ○ 4.8.3.1 - Tabletop exercise ○ 4.8.3.2 - Simulation 4.8.4 - Root cause analysis 4.8.5 - Threat hunting 4.8.6 - Digital forensics <ul style="list-style-type: none"> ○ 4.8.6.1 - Legal hold ○ 4.8.6.2 - Chain of custody ○ 4.8.6.3 - Acquisition ○ 4.8.6.4 - Reporting ○ 4.8.6.5 - Preservation ○ 4.8.6.6 - E-discovery | <p>7.1 9.1, 9.3 13.2</p> |
| 4.9 | <p>Given a scenario, use data sources to support an investigation</p> <ul style="list-style-type: none"> 4.9.1 - Log data <ul style="list-style-type: none"> ○ 4.9.1.1 - Firewall logs ○ 4.9.1.2 - Application logs ○ 4.9.1.3 - Endpoint logs ○ 4.9.1.4 - OS-specific security logs ○ 4.9.1.5 - IPS/IDS logs ○ 4.9.1.6 - Network logs ○ 4.9.1.7 - Metadata 4.9.2 - Data sources <ul style="list-style-type: none"> ○ 4.9.2.1 - Vulnerability scans ○ 4.9.2.2 - Automated reports ○ 4.9.2.3 - Dashboards | <p>6.2, 6.4, 6.5 7.1, 7.2, 7.3 9.2, 9.3 12.3</p> |

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| | <ul style="list-style-type: none"> ○ 4.9.2.4 - Packet captures | |
| 5.0 | Security Program Management and Oversight | |
| 5.1 | <p>Summarize elements of effective security governance</p> <ul style="list-style-type: none"> 5.1.1 - Guidelines 5.1.2 - Policies <ul style="list-style-type: none"> ○ 5.1.2.1 - Acceptable use policy (AUP) ○ 5.1.2.2 - Information security policies ○ 5.1.2.3 - Business continuity ○ 5.1.2.4 - Disaster recovery ○ 5.1.2.5 - Incident response ○ 5.1.2.6 - Software development lifecycle (SDLC) ○ 5.1.2.7 - Change management 5.1.3 - Standards <ul style="list-style-type: none"> ○ 5.1.3.1 - Password ○ 5.1.3.2 - Access control ○ 5.1.3.3 - Physical security ○ 5.1.3.4 - Encryption 5.1.4 - Procedures <ul style="list-style-type: none"> ○ 5.1.4.1 - Change management ○ 5.1.4.2 - Onboarding/offboarding ○ 5.1.4.3 - Playbooks 5.1.5 - External considerations <ul style="list-style-type: none"> ○ 5.1.5.1 - Regulatory ○ 5.1.5.2 - Legal ○ 5.1.5.3 - Industry ○ 5.1.5.4 - Local/regional ○ 5.1.5.5 - National ○ 5.1.5.6 - Global 5.1.6 - Monitoring and revision 5.1.7 - Types of governance structures <ul style="list-style-type: none"> ○ 5.1.7.1 - Boards ○ 5.1.7.2 - Committees ○ 5.1.7.3 - Government entities ○ 5.1.7.4 - Centralized/decentralized | <p>4.1 5.7, 5.10</p> <p>7.3</p> <p>8.9</p> <p>9.1</p> <p>10.7</p> <p>11.1, 11.2</p> <p>12.1, 12.2, 12.3</p> <p>13.1, 13.2</p> |

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| | <p>5.1.8 - Roles and responsibilities for systems and data</p> <ul style="list-style-type: none"> ○ 5.1.8.1 - Owners ○ 5.1.8.2 - Controllers ○ 5.1.8.3 - Processors ○ 5.1.8.4 - Custodians/stewards | |
| 5.2 | <p>Explain elements of the risk management process</p> <p>5.2.1 - Risk identification</p> <p>5.2.2 - Risk assessment</p> <ul style="list-style-type: none"> ○ 5.2.2.1 - Ad hoc ○ 5.2.2.2 - Recurring ○ 5.2.2.3 - One-time ○ 5.2.2.4 - Continuous <p>5.2.3 - Risk analysis</p> <ul style="list-style-type: none"> ○ 5.2.3.1 - Qualitative ○ 5.2.3.2 - Quantitative ○ 5.2.3.3 - Single loss expectancy (SLE) ○ 5.2.3.4 - Annualized loss expectancy (ALE) ○ 5.2.3.5 - Annualized rate of occurrence (ARO) ○ 5.2.3.6 - Probability ○ 5.2.3.7 - Likelihood ○ 5.2.3.8 - Exposure factor ○ 5.2.3.9 - Impact <p>5.2.4 - Risk register</p> <ul style="list-style-type: none"> ○ 5.2.4.1 - Key risk indicators ○ 5.2.4.2 - Risk owners ○ 5.2.4.3 - Risk threshold <p>5.2.5 - Risk tolerance</p> <p>5.2.6 - Risk appetite</p> <ul style="list-style-type: none"> ○ 5.2.6.1 - Expansionary ○ 5.2.6.2 - Conservative ○ 5.2.6.3 - Neutral <p>5.2.7 - Risk management strategies</p> <ul style="list-style-type: none"> ○ 5.2.7.1 - Transfer ○ 5.2.7.2 - Accept ○ 5.2.7.2.1 - Exemption ○ 5.2.7.2.2 - Exception | <p>8.9</p> <p>11.2</p> <p>12.1</p> |

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| | <ul style="list-style-type: none"> ○ 5.2.7.3 - Avoid ○ 5.2.7.4 - Mitigate <p>5.2.8 - Risk reporting</p> <p>5.2.9 - Business impact analysis</p> <ul style="list-style-type: none"> ○ 5.2.9.1 - Recovery time objective (RTO) ○ 5.2.9.2 - Recovery point objective (RPO) ○ 5.2.9.3 - Mean time to repair (MTTR) ○ 5.2.9.4 - Mean time between failures (MTBF) | |
| 5.3 | <p>Explain the processes associated with third-party risk assessment and management</p> <p>5.3.1 - Vendor assessment</p> <ul style="list-style-type: none"> ○ 5.3.1.1 - Penetration testing ○ 5.3.1.2 - Right-to-audit clause ○ 5.3.1.3 - Evidence of internal audits ○ 5.3.1.4 - Independent assessments ○ 5.3.1.5 - Supply chain analysis <p>5.3.2 - Vendor selection</p> <ul style="list-style-type: none"> ○ 5.3.2.1 - Due diligence ○ 5.3.2.2 - Conflict of interest <p>5.3.3 - Agreement types</p> <ul style="list-style-type: none"> ○ 5.3.3.1 - Service-level agreement (SLA) ○ 5.3.3.2 - Memorandum of agreement (MOA) ○ 5.3.3.3 - Memorandum of understanding (MOU) ○ 5.3.3.4 - Master service agreement (MSA) ○ 5.3.3.5 - Work order (WO)/statement of work (SOW) ○ 5.3.3.6 - Non-disclosure agreement (NDA) ○ 5.3.3.7 - Business partners agreement (BPA) <p>5.3.4 - Vendor monitoring</p> <p>5.3.5 - Questionnaires</p> <p>5.3.6 - Rules of engagement</p> | <p>7.4</p> <p>9.4</p> <p>10.4</p> <p>12.2</p> <p>13.2</p> |
| 5.4 | <p>Summarize elements of effective security compliance</p> <p>5.4.1 - Compliance reporting</p> <ul style="list-style-type: none"> ○ 5.4.1.1 - Internal ○ 5.4.1.2 - External | <p>6.2</p> <p>13.1, 13.2</p> |

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| | <ul style="list-style-type: none"> 5.4.2 - Consequences of non-compliance <ul style="list-style-type: none"> ○ 5.4.2.1 - Fines ○ 5.4.2.2 - Sanctions ○ 5.4.2.3 - Reputational damage ○ 5.4.2.4 - Loss of license ○ 5.4.2.5 - Contractual impacts 5.4.3 - Compliance monitoring <ul style="list-style-type: none"> ○ 5.4.3.1 - Due diligence/care ○ 5.4.3.2 - Attestation and acknowledgement ○ 5.4.3.3 - Internal and external ○ 5.4.3.4 - Automation 5.4.4 - Privacy <ul style="list-style-type: none"> ○ 5.4.4.1 - Legal implications <ul style="list-style-type: none"> ○ 5.4.4.1.1 - Local/regional ○ 5.4.4.1.2 - National ○ 5.4.4.1.3 - Global ○ 5.4.4.2 - Data subject ○ 5.4.4.3 - Controller vs. processor ○ 5.4.4.4 - Ownership ○ 5.4.4.5 - Data inventory and retention ○ 5.4.4.6 - Right to be forgotten | |
| <p>5.5</p> | <p>Explain types and purposes of audits and assessments</p> <ul style="list-style-type: none"> 5.5.1 - Attestation 5.5.2 - Internal <ul style="list-style-type: none"> ○ 5.5.2.1 - Compliance ○ 5.5.2.2 - Audit committee ○ 5.5.2.3 - Self-assessments 5.5.3 - External <ul style="list-style-type: none"> ○ 5.5.3.1 - Regulatory ○ 5.5.3.2 - Examinations ○ 5.5.3.3 - Assessment ○ 5.5.3.4 - Independent third-party audit 5.5.4 - Penetration testing <ul style="list-style-type: none"> ○ 5.5.4.1 - Physical ○ 5.5.4.2 - Offensive ○ 5.5.4.3 - Defensive | <p>6.2, 6.5 7.4 12.3</p> |

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| | <ul style="list-style-type: none"> ○ 5.5.4.4 - Integrated ○ 5.5.4.5 - Known environment ○ 5.5.4.6 - Partially known environment ○ 5.5.4.7 - Unknown environment ○ 5.5.4.8 - Reconnaissance ○ 5.5.4.8.1 - Passive ○ 5.5.4.8.2 - Active | |
| 5.6 | <p>Given a scenario, implement security awareness practices</p> <ul style="list-style-type: none"> 5.6.1 - Phishing <ul style="list-style-type: none"> ○ 5.6.1.1 - Campaigns ○ 5.6.1.2 - Recognizing a phishing attempt ○ 5.6.1.3 - Responding to reported suspicious messages 5.6.2 - Anomalous behavior recognition <ul style="list-style-type: none"> ○ 5.6.2.1 - Risky ○ 5.6.2.2 - Unexpected ○ 5.6.2.3 - Unintentional 5.6.3 - User guidance and training <ul style="list-style-type: none"> ○ 5.6.3.1 - Policy/handbooks ○ 5.6.3.2 - Situational awareness ○ 5.6.3.3 - Insider threat ○ 5.6.3.4 - Password management ○ 5.6.3.5 - Removable media and cables ○ 5.6.3.6 - Social engineering ○ 5.6.3.7 - Operational security ○ 5.6.3.8 - Hybrid/remote work environments 5.6.4 - Reporting and monitoring <ul style="list-style-type: none"> ○ 5.6.4.1 - Initial ○ 5.6.4.2 - Recurring 5.6.5 - Development 5.6.6 - Execution | <p>2.2 6.3, 6.6 7.3 10.9 13.2</p> |

Objective Mapping: LabSim Section to TestOut Security Pro Objective

| Section | Title | Objectives |
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| 1.0 | Security Concepts | |
| 1.1 | Security Introduction | |
| 1.2 | Security Controls | |
| 1.3 | Use the Simulator | |
| 2.0 | Threats, Vulnerabilities, and Mitigations | |
| 2.1 | Understanding Attacks | |
| 2.2 | Social Engineering | 5.2 Assessment techniques <ul style="list-style-type: none"> • 5.2.2 Identify social engineering |
| 2.3 | Malware | 3.1 Harden computer systems <ul style="list-style-type: none"> • 3.1.2 Configure anti-virus protection |
| 3.0 | Cryptographic Solutions | |
| 3.1 | Cryptography | 4.2 Implement Encryption Technologies <ul style="list-style-type: none"> • 4.2.1 Encrypt data communications |
| 3.2 | Cryptography Implementations | 4.2 Implement Encryption Technologies |

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| | | <ul style="list-style-type: none"> • 4.2.1 Encrypt data communications • 4.2.2 Encrypt files |
| 3.3 | Hashing | 4.2 Implement Encryption Technologies <ul style="list-style-type: none"> • 4.2.1 Encrypt data communications |
| 3.4 | Encryption | 4.2 Implement Encryption Technologies <ul style="list-style-type: none"> • 4.2.2 Encrypt files |
| 3.5 | Public Key Infrastructure | 4.2 Implement Encryption Technologies <ul style="list-style-type: none"> • 4.2.3 Manage certificates |
| 4.0 | Identity and Access Management | |
| 4.1 | Access Control Models | |
| 4.2 | Authentication | |
| 4.3 | Authorization | |
| 4.4 | Active Directory Overview | 1.1 Manage identity <ul style="list-style-type: none"> • 1.1.1 Manage Windows local and domain users and groups • 1.1.3 Manage Active Directory OUs 1.2 Harden authentication <ul style="list-style-type: none"> • 1.2.5 Configure and link Group Policy Objects (GPO) |

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| 4.5 | Hardening Authentication | 1.2 Harden authentication <ul style="list-style-type: none"> • 1.2.1 Configure account policies • 1.2.2 Manage account password • 1.2.3 Secure default and local accounts • 1.2.4 Enforce User Account Control (UAC) • 1.2.5 Configure and link Group Policy Objects (GPO) |
| 4.6 | Linux Users | 1.1 Manage identity <ul style="list-style-type: none"> • 1.1.2 Manage Linux users and groups 1.2 Harden authentication <ul style="list-style-type: none"> • 1.2.2 Manage account password • 1.2.3 Secure default and local accounts |
| 4.7 | Linux Groups | 1.1 Manage identity <ul style="list-style-type: none"> • 1.1.2 Manage Linux users and groups |
| 4.8 | Remote Access | 2.2 Harden network devices <ul style="list-style-type: none"> • 2.2.3 Configure and access a Virtual Private Network (VPN) |
| 4.9 | Network Authentication | |
| 5.0 | Network Architecture | |

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| 5.1 | Enterprise Network Architecture | |
| 5.2 | Security Appliances | <p>2.1 Harden physical access</p> <ul style="list-style-type: none"> • 2.1.2 Install and configure a security appliance • 2.1.4 Create and configure a screened subnet |
| 5.3 | Screened Subnets | <p>2.1 Harden physical access</p> <ul style="list-style-type: none"> • 2.1.4 Create and configure a screened subnet |
| 5.4 | Firewalls | <p>2.1 Harden physical access</p> <ul style="list-style-type: none"> • 2.1.3 Install and configure a firewall |
| 5.5 | Virtual Private Networks | <p>2.2 Harden network devices</p> <ul style="list-style-type: none"> • 2.2.3 Configure and access a Virtual Private Network (VPN) • 2.2.4 Harden a wireless network |
| 5.6 | Network Access Control | |
| 5.7 | Network Device Vulnerabilities | <p>2.2 Harden network devices</p> <ul style="list-style-type: none"> • 2.2.1 Configure and access a switch |
| 5.8 | Network Applications | |
| 5.9 | Switch Security and Attacks | <p>2.2 Harden network devices</p> <ul style="list-style-type: none"> • 2.2.1 Configure and access a switch |

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| 5.10 | Router Security | 2.2 Harden network devices <ul style="list-style-type: none"> 2.2.5 Configure router security |
| 6.0 | Resiliency and Site Security | |
| 6.1 | Physical Threats | 2.1 Harden physical access <ul style="list-style-type: none"> 2.1.1 Implement physical security |
| 6.2 | Monitoring and Reconnaissance | 2.2 Harden network devices <ul style="list-style-type: none"> 2.2.4 Harden a wireless network |
| 6.3 | Intrusion Detection | 5.2 Assessment techniques <ul style="list-style-type: none"> 5.2.1 Implement intrusion detection |
| 6.4 | Protocol Analyzers | |
| 6.5 | Analyzing Network Attacks | 5.2 Assessment techniques <ul style="list-style-type: none"> 5.2.4 Analyze network attacks 5.2.5 Analyze password attacks |
| 6.6 | Analyzing Password Attacks | 5.2 Assessment techniques <ul style="list-style-type: none"> 5.2.2 Identify social engineering 5.2.5 Analyze password attacks |
| 7.0 | Vulnerability Management | |

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| 7.1 | Vulnerability Management | <p>3.1 Harden computer systems</p> <ul style="list-style-type: none"> 3.1.4 Configure Windows Update <p>5.2 Assessment techniques</p> <ul style="list-style-type: none"> 5.2.3 Scan for vulnerabilities |
| 7.2 | Vulnerability Scanning | <p>5.2 Assessment techniques</p> <ul style="list-style-type: none"> 5.2.3 Scan for vulnerabilities |
| 7.3 | Alerting and Monitoring | <p>3.1 Harden computer systems</p> <ul style="list-style-type: none"> 3.1.2 Configure anti-virus protection <p>4.2 Implement Encryption Technologies</p> <ul style="list-style-type: none"> 4.2.1 Encrypt data communications 4.2.2 Encrypt files <p>5.1 Implement logging and auditing</p> <ul style="list-style-type: none"> 5.1.2 Enable device logs |
| 7.4 | Penetration Testing | <p>5.2 Assessment techniques</p> <ul style="list-style-type: none"> 5.2.3 Scan for vulnerabilities |
| 8.0 | Network and Endpoint Security | |
| 8.1 | Operating System Hardening | <p>1.1 Manage identity</p> |

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| | | <ul style="list-style-type: none"> • 1.1.1 Manage Windows local and domain users and groups <p>1.2 Harden authentication</p> <ul style="list-style-type: none"> • 1.2.5 Configure and link Group Policy Objects (GPO) <p>2.1 Harden physical access</p> <ul style="list-style-type: none"> • 2.1.3 Install and configure a firewall <p>3.1 Harden computer systems</p> <ul style="list-style-type: none"> • 3.1.2 Configure anti-virus protection • 3.1.4 Configure Windows Update <p>3.2 Implement application defenses</p> <ul style="list-style-type: none"> • 3.2.1 Implement an application allow list |
| 8.2 | File Server Security | <p>3.1 Harden computer systems</p> <ul style="list-style-type: none"> • 3.1.1 Configure file system inheritance • 3.1.3 Configure NTFS permissions <p>4.2 Implement Encryption Technologies</p> <ul style="list-style-type: none"> • 4.2.2 Encrypt files |
| 8.3 | Linux Host Security | <p>2.1 Harden physical access</p> <ul style="list-style-type: none"> • 2.1.3 Install and configure a firewall |

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| 8.4 | Wireless Overview | <p>2.2 Harden network devices</p> <ul style="list-style-type: none"> • 2.2.2 Configure and access a wireless network |
| 8.5 | Wireless Attacks | <p>2.2 Harden network devices</p> <ul style="list-style-type: none"> • 2.2.2 Configure and access a wireless network • 2.2.4 Harden a wireless network |
| 8.6 | Wireless Defenses | <p>2.2 Harden network devices</p> <ul style="list-style-type: none"> • 2.2.2 Configure and access a wireless network • 2.2.4 Harden a wireless network |
| 8.7 | Data Transmission Security | <p>3.2 Implement application defenses</p> <ul style="list-style-type: none"> • 3.2.3 Configure web application security <p>4.2 Implement Encryption Technologies</p> <ul style="list-style-type: none"> • 4.2.1 Encrypt data communications |
| 8.8 | Web Application Security | <p>3.2 Implement application defenses</p> <ul style="list-style-type: none"> • 3.2.3 Configure web application security • 3.2.5 Configure browser settings |
| 8.9 | Application Development and Security | <p>3.2 Implement application defenses</p> <ul style="list-style-type: none"> • 3.2.1 Implement an application allow list |

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| | | <ul style="list-style-type: none"> • 3.2.2 Implement Data Execution Prevention (DEP) |
| 9.0 | Incident Response | |
| 9.1 | Incident Response and Mitigation | <p>5.2 Assessment techniques</p> <ul style="list-style-type: none"> • 5.2.4 Analyze network attacks • 5.2.5 Analyze password attacks |
| 9.2 | Log Management | <p>5.1 Implement logging and auditing</p> <ul style="list-style-type: none"> • 5.1.2 Enable device logs <p>5.2 Assessment techniques</p> <ul style="list-style-type: none"> • 5.2.1 Implement intrusion detection • 5.2.3 Scan for vulnerabilities |
| 9.3 | Digital Forensics | |
| 9.4 | Redundancy | <p>4.1 Protect and Maintain Data files</p> <ul style="list-style-type: none"> • 4.1.2 Implement redundancy |
| 9.5 | Backup and Restore | <p>4.1 Protect and Maintain Data files</p> <ul style="list-style-type: none"> • 4.1.1 Perform data backups and recovery |
| 10.0 | Protocol, App, and Cloud Security | |

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| 10.1 | Host Virtualization | <p>3.3 Implement virtualization</p> <ul style="list-style-type: none"> • 3.3.1 Create virtual machines • 3.3.2 Create virtual switches <p>5.2 Assessment techniques</p> <ul style="list-style-type: none"> • 5.2.3 Scan for vulnerabilities |
| 10.2 | Virtual Networking | <p>3.3 Implement virtualization</p> <ul style="list-style-type: none"> • 3.3.1 Create virtual machines • 3.3.2 Create virtual switches |
| 10.3 | Software-Defined Networking | |
| 10.4 | Cloud Services | |
| 10.5 | Mobile Devices | <p>2.2 Harden network devices</p> <ul style="list-style-type: none"> • 2.2.6 Bring Your Own Device (BYOD) security |
| 10.6 | Mobile Device Management | <p>2.2 Harden network devices</p> <ul style="list-style-type: none"> • 2.2.6 Bring Your Own Device (BYOD) security <p>3.2 Implement application defenses</p> <ul style="list-style-type: none"> • 3.2.1 Implement an application allow list |
| 10.7 | BYOD Security | <p>2.2 Harden network devices</p> |

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| | | <ul style="list-style-type: none"> • 2.2.2 Configure and access a wireless network • 2.2.6 Bring Your Own Device (BYOD) security |
| 10.8 | Embedded and Specialized Systems | |
| 10.9 | Email | 3.2 Implement application defenses <ul style="list-style-type: none"> • 3.2.1 Implement an application allow list • 3.2.4 Configure email filters and settings • 3.2.5 Configure browser settings |
| 11.0 | Security Governance Concepts | |
| 11.1 | Policies, Standards, and Procedures | |
| 11.2 | Change Management | |
| 11.3 | Automation and Orchestration | |
| 12.0 | Risk Management Processes | |
| 12.1 | Risk Management Processes and Concepts | |
| 12.2 | Vendor Management | |
| 12.3 | Audits and Assessments | 1.2 Harden authentication <ul style="list-style-type: none"> • 1.2.5 Configure and link Group Policy Objects (GPO) |

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| | | <p>5.1 Implement logging and auditing</p> <ul style="list-style-type: none"> • 5.1.1 Configure advanced audit policy • 5.1.2 Enable device logs |
| 13.0 | Data Protection and Compliance | |
| 13.1 | Data Classification and Compliance | |
| 13.2 | Personnel Policies | |
| A.0 | CompTIA Security+ SY0-701 - Practice Exams | |
| A.1 | Prepare for CompTIA Security+ SY0-701 Certification | |
| A.2 | CompTIA Security+ Domain Review (20 Questions) | |
| A.3 | CompTIA Security+ Domain Review (All Questions) | |
| B.0 | TestOut Security Pro - Practice Exams | |
| B.1 | Prepare for TestOut Security Pro Certification | |
| B.2 | TestOut Security Pro Domain Review | |

Objective Mapping: TestOut Security Pro Objective to LabSim Section

| # | Domain | Module.Section |
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| 1.0 | Identity Management and Authentication | |
| 1.1 | Manage identity 1.1.1 Manage Windows local and domain users and groups 1.1.2 Manage Linux users and groups 1.1.3 Manage Active Directory OUs | 4.4, 4.6, 4.7 8.1 |
| 1.2 | Harden authentication 1.2.1 Configure account policies 1.2.2 Manage account password 1.2.3 Secure default and local accounts 1.2.4 Enforce User Account Control (UAC) 1.2.5 Configure and link Group Policy Objects (GPO) | 4.4, 4.5, 4.6 8.1 12.3 |
| 2.0 | Physical and Network Security | |
| 2.1 | Harden physical access 2.1.1 Implement physical security 2.1.2 Install and configure a security appliance 2.1.3 Install and configure a firewall 2.1.4 Create and configure a screened subnet 2.1.5 Configure Network Address Translation (NAT) | 5.2, 5.3, 5.4 6.1 8.1, 8.3 |
| 2.2 | Harden network devices 2.2.1 Configure and access a switch 2.2.2 Configure and access a wireless network | 4.8 5.5, 5.7, 5.9, 5.10 |

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| | <ul style="list-style-type: none"> 2.2.3 Configure and access a Virtual Private Network (VPN) 2.2.4 Harden a wireless network 2.2.5 Configure router security 2.2.6 Bring Your Own Device (BYOD) security 2.2.7 Create and connect to a Virtual Local Area Network (VLAN) | <p>6.2</p> <p>8.4, 8.5, 8.6</p> <p>10.5, 10.6, 10.7</p> |
| 3.0 | Host and Application Defense | |
| 3.1 | <p>Harden computer systems</p> <ul style="list-style-type: none"> 3.1.1 Configure file system inheritance 3.1.2 Configure anti-virus protection 3.1.3 Configure NTFS permissions 3.1.4 Configure Windows Update | <p>2.3</p> <p>7.1, 7.3</p> <p>8.1, 8.2</p> |
| 3.2 | <p>Implement application defenses</p> <ul style="list-style-type: none"> 3.2.1 Implement an application allow list 3.2.2 Implement Data Execution Prevention (DEP) 3.2.3 Configure web application security 3.2.4 Configure email filters and settings 3.2.5 Configure browser settings | <p>8.1, 8.7, 8.8, 8.9</p> <p>10.6, 10.9</p> |
| 3.3 | <p>Implement virtualization</p> <ul style="list-style-type: none"> 3.3.1 Create virtual machines 3.3.2 Create virtual switches | <p>10.1, 10.2</p> |
| 4.0 | Data Security | |
| 4.1 | <p>Protect and Maintain Data files</p> <ul style="list-style-type: none"> 4.1.1 Perform data backups and recovery | <p>9.4, 9.5</p> |

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| | 4.1.2 Implement redundancy | |
| 4.2 | Implement Encryption Technologies 4.2.1 Encrypt data communications 4.2.2 Encrypt files 4.2.3 Manage certificates | 3.1, 3.2, 3.3, 3.4, 3.5 7.3 8.2, 8.7 |
| 5.0 | Audit and Security Assessment | |
| 5.1 | Implement logging and auditing 5.1.1 Configure advanced audit policy 5.1.2 Enable device logs | 7.3 9.2 12.3 |
| 5.2 | Assessment techniques 5.2.1 Implement intrusion detection 5.2.2 Identify social engineering 5.2.3 Scan for vulnerabilities 5.2.4 Analyze network attacks 5.2.5 Analyze password attacks | 2.2 6.3, 6.5, 6.6 7.1, 7.2, 7.4 9.1, 9.2 10.1 |

